Q24 ORDER NO. HAD84062827A8–T

Service Manual

Tentative

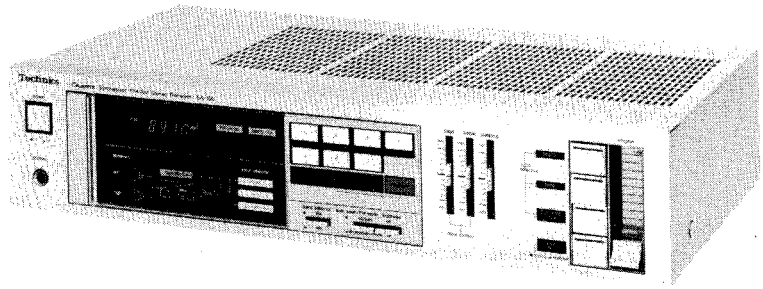
QUARTZ Synthesizer
FM/AM Stereo Receiver

Receiver

SA-150

Color

(S)	Silver Type
(K)	Black Type



Color	Area	
(S) (K)	[EX] ···	Scandinavia and Switzerland
(S) (K)	[EH] ···	Holland
(S)	[XA] ···	Southeast Asia, Oceania, Africa, Middle Near East and Central South America
(S) (K)	[XL] ···	Australia
(S)	[XM] ···	Latin America
(S)	[Ei] ····	Italy

Please use this manual together with the service manual for Model No. SA-150[M], Order No. HAD84022715C1.

English

SPECIFICATIONS

(DIN 45 500)

■ AMPLIFIER SECTION

1 kHz continuous power output	
both channels driven	2 × 27W (8Ω)
Total harmonic distortion	
half power at 1 kHz	0.07% (8Ω)
Intermodulation distortion	
rated power at 60 Hz: 7 kHz=4:1, SMPTE, 8Ω	0.5%
Power bandwidth	
both channels driven, −3 dB	10 Hz~40 kHz (8Ω)
Damping factor	30 (8Ω)
Input sensitivity and impedance	
PHONO	2.5 mV/47kΩ
CD/VIDEO/AUX, TAPE/EXT	150 mV/18kΩ
PHONO maximum input voltage (1 kHz, RMS)	150 mV
S/N	
rated power (8Ω)	
PHONO	70 dB (IHF, A: 71 dB)
CD/VIDEO/AUX, TAPE/EXT	88 dB (IHF, A: 95 dB)
Frequency response	
PHONO	RIAA standard curve ±0.8 dB (30 Hz~15 kHz)
CD/VIDEO/AUX, TAPE/EXT	5 Hz~70 kHz (−3 dB)
Tone controls	
BASS	50 Hz, +10 dB~ −10 dB
TREBLE	20 kHz, +10 dB~ −10 dB
Loudness control (volume at −30 dB)	50 Hz, +9 dB
Output voltage	
TAPE/EXT (REC OUT)	150 mV
Channel balance, CD/VIDEO/AUX 250 Hz~6,300 Hz	±1 dB
Channel separation, CD/VIDEO/AUX 1 kHz	55 dB
Headphones output level and impedance	380 mV/330Ω
Load impedance	8Ω~16Ω

■ FM TUNER SECTION

Frequency range	87.50~108.00 MHz
Sensitivity	
S/N 30 dB	1.9 μV (300Ω), 1.3 μV (75Ω)
S/N 26 dB	1.7 μV (300Ω), 1.2 μV (75Ω)
S/N 20 dB	1.5 μV (300Ω), 0.9 μV (75Ω)
IHF usable sensitivity	1.9 μV (IHF '58)
IHF 46 dB stereo quieting sensitivity	22 μV/75Ω
Total harmonic distortion	
MONO	0.15%
STEREO	0.3%
S/N	
MONO	60 dB (77 dB, IHF)
STEREO	58 dB (71 dB, IHF)
Frequency response	20 Hz~15 kHz, +1 dB~ −2 dB
Alternate channel selectivity	±400 kHz, 65 dB
Capture ratio	1 dB
Image rejection at 98 MHz	50 dB
IF rejection at 98 MHz	75 dB
Spurious response rejection at 98 MHz	82 dB
AM suppression	50 dB
Stereo separation	
1 kHz	40 dB
10 kHz	30 dB
Carrier leak	
19 kHz	−33 dB (−35 dB, IHF)
38 kHz	−50 dB (−50 dB, IHF)
Channel balance (250 Hz~6,300 Hz)	±1.5 dB
Limiting point	1.2 μV
Bandwidth	
IF amplifier	180 kHz
FM demodulator	1000 kHz
Antenna terminals	300Ω (balanced) 75Ω (unbalanced)

Technics

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

SA-150

■ AM TUNER SECTION

Frequency range	522~1611 kHz
Sensitivity (S/N 20 dB)	20 μV, 300 μV/m
Selectivity	55 dB
Image rejection at 999 kHz	40 dB
IF rejection at 999 kHz	60 dB

■ GENERAL

Power consumption	155W
Power supply	
For Australia	AC 50 Hz/60 Hz, 240V
For continental Europe	AC 50 Hz/60 Hz, 220V
For others	AC 50 Hz/60 Hz, 110V/120V/220V/240V
Dimensions (W×H×D)	430 × 97 × 243 mm (16-15/16" × 3-13/16" × 9-9/16")
Weight	4.8 kg (10.6 lb.)

Specifications are subject to change without notice for further improvement.

Deutsch

TECHNISCHE DATEN

(DIN 45 500)

■ VERSTÄRKERTEIL

Dauerton-Ausgangsleistung bei 1 kHz	
beide Kanäle ausgesteuert	2 × 27W (8 Ω)
Gesamtklirrfaktor	
halbe Nennleistung bei 1 kHz	0,07% (8Ω)
Intermodulationsfaktor	
Nennleistung bei 60 Hz: 7 kHz = 4:1, nach SMPTE, 8 Ω	0,5%
Leistungsbandbreite	
beide Kanäle ausgesteuert bei −3 dB	10 Hz~40 kHz (8Ω)
Dämpfungsfaktor	30 (8 Ω)
Eingangsempfindlichkeit und -impedanz	
Phono	2,5 mV/47 kΩ
CD/VIDEO/AUX, TAPE/EXT	150 mV/18 kΩ
Maximale TA-Eingangsspannung (1 kHz, eff.)	150 mV
Geräuschabstand	
Nennleistung (8Ω)	
Phono	70 dB (IHF, A: 71 dB)
CD/VIDEO/AUX, TAPE/EXT	88 dB (IHF, A: 95 dB)
Frequenzgang	
Phono	RIAA-Standardkurve ±0,8 dB (30 Hz ~ 15 kHz)
CD/VIDEO/AUX, TAPE/EXT	5 Hz ~ 70 kHz(−3 dB)
Klangregler	
Baßregler (BASS)	50 Hz, +10 dB ~ −10 dB
Höhenregler (TREBLE)	20 kHz, +10 dB ~ −10 dB
Gehörrichtige Lautstärkekorrektur (Loudness)	
(bei −30 dB Ausgangsleistung)	50 Hz, +9 dB
Ausgangsspannung	
TAPE/EXT (REC OUT)	150 mV
Kanalabweichung (CD/VIDEO/AUX 250 Hz~6.300 Hz)	±1 dB
Übersprechdämpfung (CD/VIDEO/AUX 1kHz)	55 dB
Kopfhörerpegel und -impedanz	380 mV/330Ω
Lautsprecherimpedanz	8Ω~16Ω

■ UKW-TUNERTEIL

Wellenbereich	87,50 ~ 108,00 MHz
Eingangsempfindlichkeit	
S/R 30 dB	1,9 μV (300 Ω), 1,3 μV (75 Ω)
S/R 26 dB	1,7 μV (300 Ω), 1,2 μV (75 Ω)
S/R 20 dB	1,5 μV (300 Ω), 0,9 μV (75 Ω)
Nutzempfindlichkeit nach IHF	1,9 μV (nach IHF '58)
Stereoumschaltschwelle bei 46 dB nach IHF	22 μV/75 Ω
Gesamtklirrfaktor	
Mono	0,15%
Stereo	0,3%
Geräuschabstand	
Mono	60 dB (77 dB nach IHF)
Stereo	58 dB (71 dB nach IHF)
Frequenzgang	20 Hz ~ 15 kHz (+1 dB ~ −2 dB)
Trennschärfe bei Störsender	±400 kHz, 65 dB
Einfangverhältnis	1 dB
Spiegelfrequenz-Dämpfung bei 98 MHz	50 dB
ZF-Dämpfung bei 98 MHz	75 dB
Ansprechdämpfung auf Nebenfrequenzen bei 98 MHz	82 dB
MW-Unterdrückung	50 dB
Übersprechdämpfung	
1 kHz	40 dB
10 kHz	30 dB
Trägerrest	
19 kHz	−33 dB (−35 dB nach IHF)
38 kHz	−50 dB (−50 dB nach IHF)
Kanalabweichung (250 Hz ~ 6300 Hz)	±1,5 dB
Begrenzereinsatz	1,2 μV
Bandbreite	
ZF-Verstärker	180 kHz
UKW-Demodulator	1000 kHz
Antennenanschluß	300 Ω (symmetrisch) 75 Ω (unsymmetrisch)

■ MW-TUNERTEIL

Wellenbereiche	522 ~ 1611 kHz
Eingangsempfindlichkeit (S/R 20 dB)	20 μV, 300 μV/m
Trennschärfe	55 dB
Spiegelfrequenz-Dämpfung bei 999 kHz	40 dB
ZF-Dämpfung bei 999 kHz	60 dB

■ ALLGEMEINE DATEN

Leistungsaufnahme	155W
Netzspannung	
Für Australien Wechselstrom	50Hz/60Hz, 240V
Für Kontinentaleuropa	Wechselstrom 50 Hz/60 Hz, 220V
Für andere Länder	Wechselstrom 50 Hz/60 Hz, 110V/120V/220V/240V
Abmessungen (B×H×T)	430 × 97 × 243 mm
Gewicht	4,8 kg

Spezifikationen können infolge von Verbesserungen ohne Ankündigung geändert werden.

Français

CARACTERISTIQUES

(DIN 45 500)

■ SECTION AMPLIFICATEUR

Puissance de sortie continue à 1 kHz	
les deux canaux en circuit	2 × 27W (8Ω)
Distorsion harmonique totale	
à demi-puissance (1 kHz)	0,07% (8Ω)
Distorsion d'intermodulation	
à puissance nominale à 60 Hz: 7 kHz=4:1, SMPTE, 8Ω	0,5%
Réponse de fréquences	
les deux canaux en circuit, −3 dB	10 Hz~40 kHz (8Ω)
Coefficient d'amortissement	30 (8Ω)
Sensibilité et impédance d'entrée	
PHONO	2,5 mV/47kΩ
CD/VIDEO/AUX, TAPE/EXT	150 mV/18kΩ
PHONO (tension d'entrée maximum, 1 kHz RMS)	150 mV
Signal/Bruit	
à puissance nominale (8Ω)	
PHONO	70 dB (IHF, A: 71 dB)
CD/VIDEO/AUX, TAPE/EXT	88 dB (IHF, A: 95 dB)
Réponse de fréquence	
PHONO	Courbe nominale RIAA ±0,8 dB (30 Hz~15 kHz)
CD/VIDEO/AUX, TAPE/EXT	5 Hz~70 kHz (−3 dB)
Réglage de la tonalité	
BASSES (BASS)	50 Hz, +10 dB~ −10 dB
AIGUS (TREBLE)	20 kHz, +10 dB~ −10 dB
Compensateur physiologique (volume à −30 dB)	50 Hz, +9 dB
Tension de sortie	150 mV
TAPE/EXT (REC OUT)	
Equilibrage des canaux,	
CD/VIDEO/AUX 250 Hz~6.300 Hz	±1 dB
Séparation des canaux, CD/VIDEO/AUX 1kHz	55 dB
Niveau de sortie des casques et impédance	380 mV/330Ω
Impédance de charge	8Ω~16Ω

■ SECTION SYNTONISATEUR FM

Gamme de fréquence	87,50~108,00 MHz
Sensibilité	
S/B 30 dB	1,9 μV (300Ω), 1,3 μV (75Ω)
S/B 26 dB	1,7 μV (300Ω), 1,2 μV (75Ω)
S/B 20 dB	1,5 μV (300Ω), 0,9 μV (75Ω)
Sensibilité utilisable IHF	1,9 μV (IHF '58)
Sensibilité stéréo au seuil de 46 dB, IHF	22 μV/75Ω
Distorsion harmonique totale	
MONO	0,15%
STEREO	0,3%
Signal/Bruit	
MONO	60 dB (77 dB, IHF)
STEREO	58 dB (71 dB, IHF)
Réponse de fréquence	20 Hz~15 kHz, +1 dB~ −2 dB
Sélectivité alternée par canal	±400 kHz, 65 dB
Taux de capture	1 dB
Rejection d'image à 98 MHz	50 dB
Rejection FI à 98 MHz	75 dB
Rejection de réponse parasite à 98 MHz	82 dB
Suppression AM	50 dB
Séparation stéréophonique	
1 kHz	40 dB
10 kHz	30 dB
Fuite de porteuse	
19 kHz	−33 dB (−35 dB, IHF)
38 kHz	−50 dB (−50 dB, IHF)
Equilibrage de canaux (250 Hz~6,300 Hz)	±1,5 dB
Point de limite	1,2 μV
Largeur de bande	
Amplificateur FI	180 kHz
Démodulateur FM	1000 kHz
Bornes d'antenne	300Ω (symétrique) 75Ω (asymétrique)

■ SECTION SYNTONISATEUR AM

Gamme de fréquence	522~1611 kHz
Sensibilité (S/B 20 dB)	20 μV, 300 μV/m
Sélectivité	55 dB
Réjection d'image à 999 kHz	40 dB
Réjection FI à 999 kHz	60 dB

■ DIVERS

Consommation	155W
Alimentation	
Pour Australien	CA 50Hz/60Hz, 240V
Pour l'Europe	CA 50 Hz/60 Hz, 220V
Autres	CA 50 Hz/60 Hz, 110V/120V/220V/240V
Dimensions (L×H×Pr)	430 × 97 × 243 mm
Poids	4.8 kg

Sujet à changement sans préaris.

Español

ESPECIFICACIONES

(DIN 45 500)

■ SECCION AMPLIFICADOR

Potencia continua de 1 kHz	
en ambos canales	2 × 27W (8Ω)
Distorsión armónica total	
mitad de potencia a 1 kHz	0,07% (8Ω)
Distorsión por intermodulación	
potencia de régimen a 60 Hz: 7 kHz=4:1, SMPTE, 8Ω	0,5%
Ancho de banda de potencia	
con ambos canales, −3 dB	10 Hz~40 kHz (8Ω)
Factor de amortiguamiento	30 (8Ω)
Sensibilidad e impedancia de entrada	
PHONO	2,5 mV/47kΩ
CD/VIDEO/AUX, TAPE/EXT	150 mV/18kΩ
Voltaje máximo de entrada de PHONO (1 kHz, RMS)	150 mV
Relación de señal a ruido	
potencia de régimen (8Ω)	
PHONO	70 dB (IHF, A: 71 dB)
CD/VIDEO/AUX, TAPE/EXT	88 dB (IHF, A: 95 dB)
Respuesta de frecuencia	
PHONO	curva RIAA estándar ±0,8 dB (30 Hz~15 kHz)
CD/VIDEO/AUX, TAPE/EXT	5 Hz~70 kHz (−3 dB)
Controles de tono	
BAJOS (BASS)	50 Hz, +10 dB~ −10 dB
AGUDOS (TREBLE)	20 kHz, +10 dB~ −10 dB
Control de sonoridad (volumen a −30 dB)	50 Hz, +9 dB
Voltaje de salida	
TAPE/EXT (REC OUT)	150 mV
Equilibrio de canales,	
CD/VIDEO/AUX 250 Hz~6.300 Hz	±1 dB
Separación de canales, CD/VIDEO/AUX 1 kHz	55 dB
Impedancia y nivel de salida de los auriculares	380 mV/330Ω
Impedancia de carga	8Ω~16Ω

■ SECCION PARA SINTONIZADOR FM

Gama de frecuencias	87,50~108,00 MHz
Sensibilidad	
Señal a ruido 30 dB	1,9 μV (300Ω), 1,3 μV (75Ω)
Señal a ruido 26 dB	1,7 μV (300Ω), 1,2 μV (75Ω)
Señal a ruido 20 dB	1,5 μV (300Ω), 0,9 μV (75Ω)
Sensibilidad utilizable IHF	1,9 μV (IHF '58)
Sensibilidad de acallamiento estéreo de 46 dB IHF	22 μV/75Ω
Distorsión armónica total	
MONO. (MONO)	0,15%
ESTEREO (STEREO)	0,3%
Relación de señal a ruido	
MONO. (MONO)	60 dB (77 dB, IHF)
ESTEREO (STEREO)	58 dB (71 dB, IHF)
Respuesta de frecuencia	20 Hz~15 kHz, +1 dB~ −2 dB
Selectividad alternada de canal	±400 kHz, 65 dB
Relación de captura	1 dB
Rechazo de imagen a 98 MHz	50 dB
Rechazo de F.I. a 98 MHz	75 dB
Rechazo de respuesta espuria a 98 MHz	82 dB
Supresión AM	50 dB
Separación estereofónica	
1 kHz	40 dB
10 kHz	30 dB
Fuga de onda portadora	
19 kHz	−33 dB (−35 dB, IHF)
38 kHz	−50 dB (−50 dB, IHF)
Equilibrio de canales 250 Hz~6 300 Hz	±1,5 dB
Punto de límite	1,2 μV
Ancho de banda	
Amplificador FI	180 kHz
Demodulador FM	1000 kHz
Bornes de antena	300Ω (equilibrado) 75Ω (no equilibrado)

■ SECCION PARA SINTONIZADOR AM

Gama de frecuencias	522~1611 kHz
Sensibilidad (Relación de señal a ruido de 20 dB)	20 μV, 300 μV/m
Selectividad	55 dB
Rechazo de imagen a 999 kHz	40 dB
Rechazo de F.I. a 999 kHz	60 dB

■ GENERAL

Consumo de energía	155W
Alimentación de energía	
Para Australien	CA 50Hz/60Hz, 240V
Para Europa continental	CA 50 Hz/60 Hz, 220V
Para otros paises	CA 50 Hz/60 Hz, 110V/120V/220V/240V
Dimensiones (An.×Al.×Prof.)	430 × 97 × 243 mm
Peso	4,8 kg

Estas especificaciones están sujetas a cualquier cambio sin previo eviso.

■ BEFORE REPAIR AND ADJUSTMENT

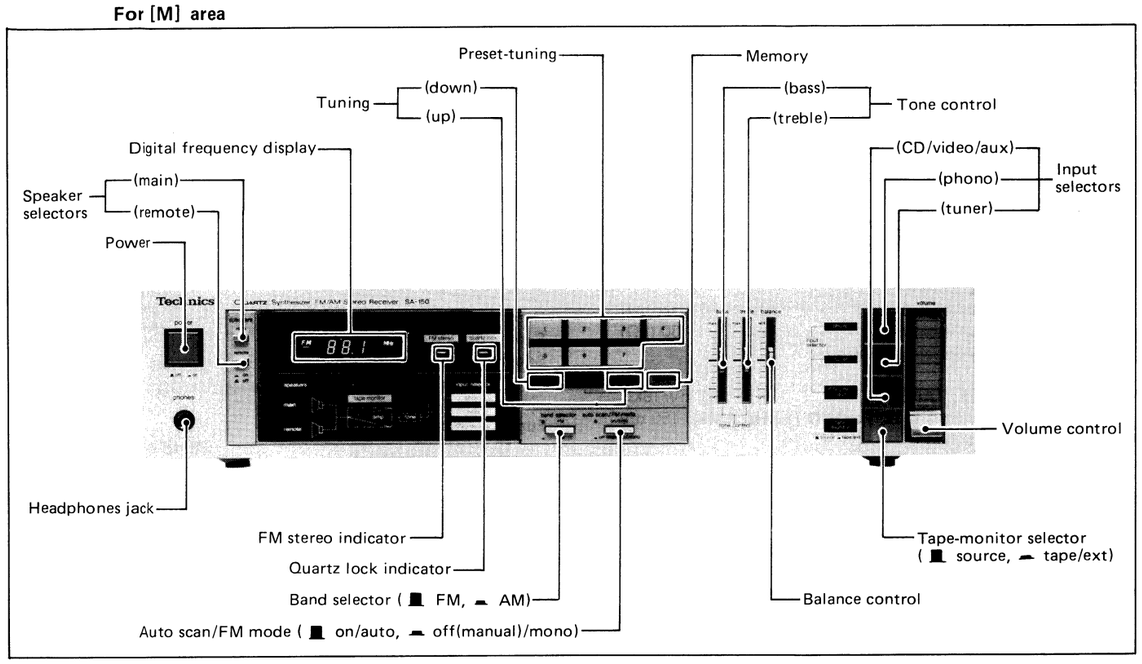
1. Turn off the power supply and short-circuit of power supply capacitors (C706, C707, 4700μF) at resistance (about 10Ω, 5W) in order to discharge the charged voltage. Do not short between C706 and C707 by screwdriver. It may damage the component.
2. Before turning on the power supply after completion of repair, slowly apply the primary voltage by using a power supply voltage controller to make sure that the consumed current is free of abnormality. The consumed current at 60Hz/50Hz in no signal mode is shown below with respect to supply voltage 110V/120V/220V/240V.

Power supply voltage		**AC110V**	**AC120V**	**AC220V**	**AC240V**
Consumed current	50Hz	120~420mA	110~410mA	70~220mA	60~210mA
	60Hz	110~410mA	100~400mA	60~210mA	50~200mA

■ LOCATION OF CONTROLS

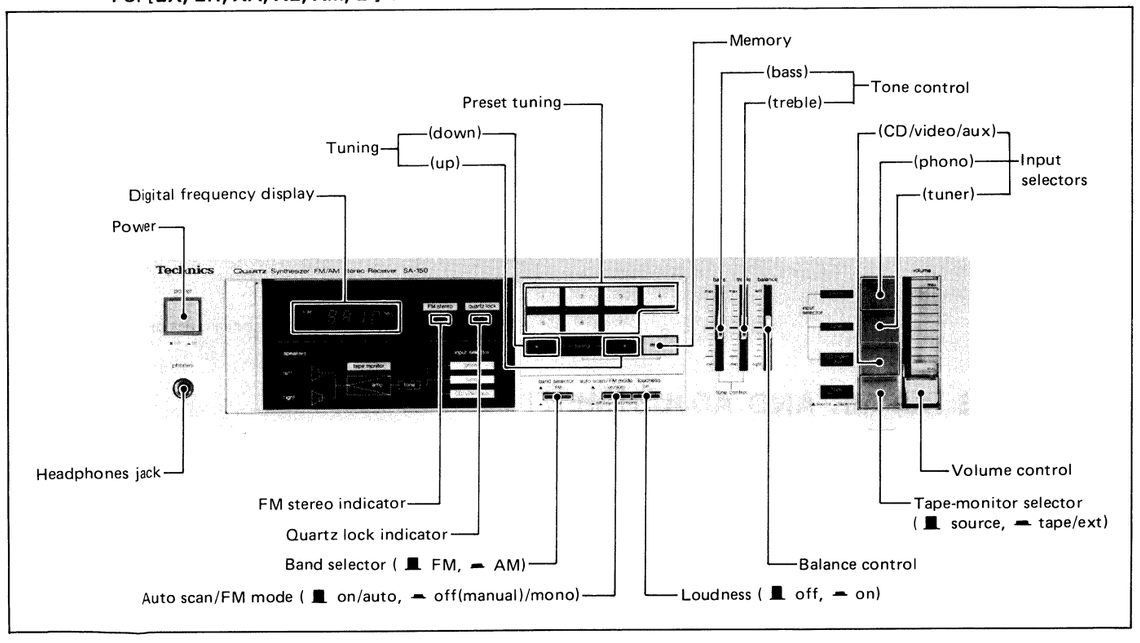
• Change of the Front panel

For [M] area



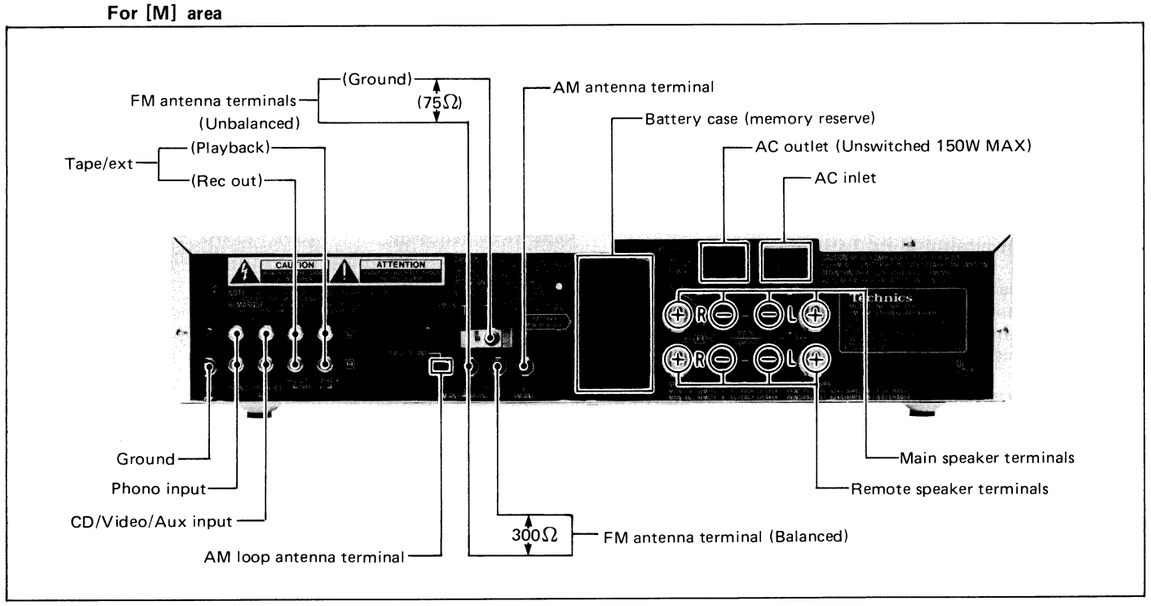
Change

For [EX, EH, XA, XL, XM, Ei] areas



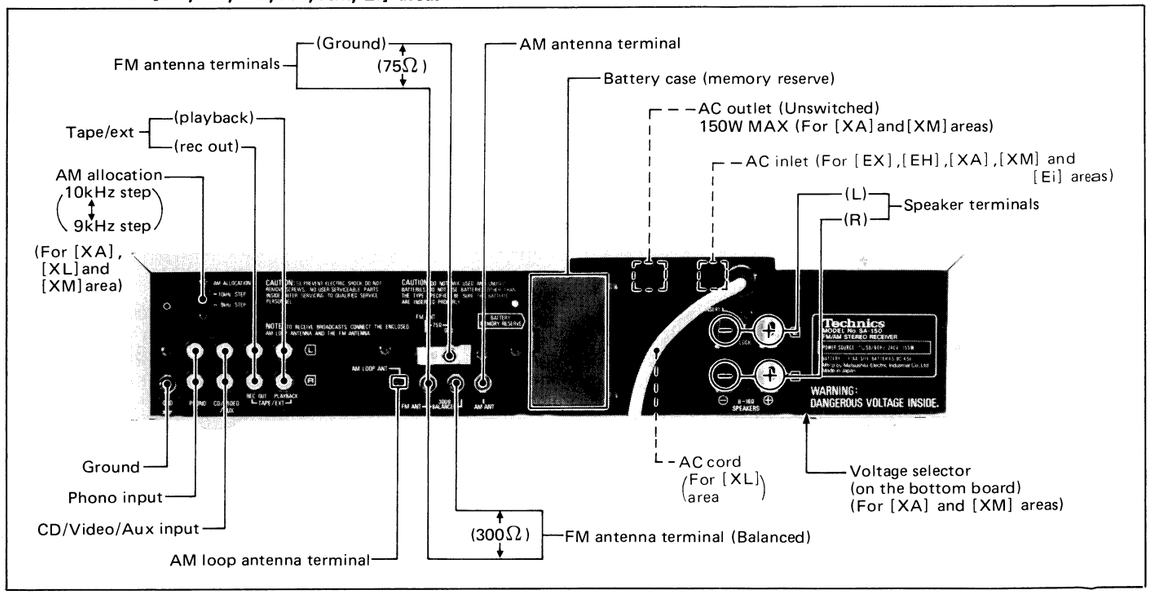
• Change of the Rear panel

For [M] area



Change

For [EX, EH, XA, XL, XM, Ei] areas



- The power supply for this unit varies depending upon the areas. Also, the parts used for power supply are different. So, refer to the circuit diagram and the replacement parts list.

* [XA, XM] areas is provided with voltage selector and AC outlets.
* 240V (50/60Hz) for Australia.
* 220V (50/60Hz) for Continental Europe.
* 110V/120V/220V/240V (50/60Hz) for other [XA, XM] areas.
* Phono input capacitance is about 150pF.

■ MESSUNGEN UND JUSTIERUNGEN

Anmerkung: Die AM OSC-Spule (L202) und AM ZFT (T201) sind bereits justiert und benötigen keine Justierung.

AM (MW)-EINSTELLUNG

- **Einstellungen und zu benutzende Geräte**
1. Elektronische Voltmeter für Wechselstrom (EVM).
2. AM (MW)-Meßsender (AM-SG)
3. Bereichsschalter . . . . . AM (MW-Abgleich)
4. Die Netzspannung auf ihren Sollwert einstellen.
5. Der Ausgang des Meßsenders darf nicht höher sein als unbedingt notwendig für eine gute Ablesung.
6. Einen nichtmetallischen Schraubenzieher für die Einstellungen verwenden.

Nr.	AM (MW)-MESSENDER ANSCHLUSS	AM (MW)-MESSENDER FREQUENZ	ANZEIGE-FREQUENZ	VORBEREITUNG	ABGLEICHS-PUNKTE	ABGLEICHSVERFAHREN
			MW-HF-ABGLEICH			
1	AM-MO über 200pF-Kondensator an den anschließen, wie in Abb. 9 gezeigt. (Schwacher Eingang.)	610kHz (400Hz, Modulat. 30%)	610kHz	Wechselstrom-Voltmeter oder Oszilloskop an den Lautsprecheranschluß anschließen.	L201 (MW Ant. Spule)	• Auf max. Ausgang abgleichen. • Den Ferritkern L201 mit einem Schraubendreher justieren.
2		1500kHz (400Hz, Modulat. 30%)	1500kHz	Wechselstrom Voltmeter oder Oszilloskop an den Lautsprecheranschluß anschließen.	CT201 (MW Osc. Trimmer)	• Auf max. Ausgang abgleichen. • Die Schritte (1) und (2) wiederholen, bis die Frequenz genau mit der Skalenanzeige übereinstimmt.

FM (UKW)-EINSTELLUNG

- **Einstellungen und zu benutzenden Geräte**
1. UKW-Meßsender (FM-SG).
2. Oszilloskop
3. Elektronische Voltmeter für Wechsel- und Gleichstrom (EVM).
4. Signalfrequenzmesser (meßbar für 19kHz und 108MHz).
5. Den Bereichsschalter auf die "FM"-Position stellen.
6. Den UKW-Betriebsart-Wahlschalter in die Position "off/mono" stellen.
7. Die anderen Einstellungen sind gleich wie beim MW-Abgleich.

* **Vorbereitung des UKW-Meßoszillators (UKW-MO)**
- Die Normal-Eingangsleistung dieses Gerätes beträgt 60 dB (1 mV), 400Hz, 100% Modulation.
(Wegen der Dämpfung bei Verwendung von Koaxialkabeln, muß die MO-Ausgangsleistung 6 dB (ZHF) oder mehr betragen; d.h. wenn die Eingangsleistung 60 dB beträgt, muß der MO-Ausgang 66 dB betragen.)

Nr.	FM (UKW)-MESSENDER ANSCHLUSS	FM (UKW)-MESSENDER FREQUENZ	ANZEIGE-FREQUENZ	VORBEREITUNG	ABGLEICHS-PUNKTE	ABGLEICHSVERFAHREN
			UKW-ZF-ABGLEICH			
3	UKW-MO an UKW-antennenanschluß anschließen, wie in Abb.10 gezeigt. (60 dB an den Antenneneingang anlegen.)	100MHz (400Hz, Modulat. 100%)	100MHz	Ein Gleichstrom-Voltmeter zwischen TP201 (+) und TP202 (—) über eine Drosselspule anschließen (siehe Abb.10)	T202 (Diskriminator ZFT)	• Den Kern von T202 so justieren, daß die gemessene Spannung im signallosen Modus im 300mV Bereich 0mV beträgt.
			UKW-HF-ABGLEICH			
4	UKW-MO an UKW-antennenanschluß anschließen.	90MHz (400Hz, Modulat. 100%)	90MHz	Oszilloskop an den Lautsprecheranschluß anschließen.	L105 (Osc. Spule)	• Auf max. Ausgang abgleichen. • Die Schritte (4) und (5) wiederholen, bis die Frequenz genau mit der Skalenanzeige übereinstimmt.
5		106MHz (400Hz, Modulat. 100%)	106MHz	Oszilloskop an den Lautsprecheranschluß anschließen.	CT101 (Ocs. Trimmer)	
			UKW-STEREO-DEKODER-ABGLEICH			

UNTER VERWENDUNG EINES ZÄHLERS	UNTER VERWENDUNG ALTERNATIVEN SYSTEMS
6 1. Unmoduliertes Mono-Signal 100MHz, 60dB in das Gerät speisen. (siehe Abb. 11) 2. Den UKW-Betriebsart-Wahlschalter auf "on/FM auto" stellen. 3. Frequenzzähler über einen Wiederstand von 100kOhm an TP301 anschließen. 4. **VR301** auf 19kHz±30Hz einstellen.	1. Stereosignal entweder von einem Stereogenerator. oder einem Sender in den Tuner einspeisen. 2. **VR301** so einstellen, daß die Stereolampe aufleuchtet. Schliefer von **VR301** mit Lack sichern, wie in Abb. 12 gezeigt.

■ MESURAGES ET RÉGLAGES

Nota: La bobine de l'oscillateur de la modulation d'amplitude (L202) et le transformateur de fréquence intermédiaire de modulation d'amplitude (T201) ont déjà été ajustés et ne nécessitent plus de réglage.

RÉGLAGE DE MA

- **Réglage et équipement utilisé**
1. Voltmètres électroniques de courant alternatif (EVM)
2. Générateur du signal MA (AM-SG).
3. Sélecteur de gamme de réglage sur la position "AM"
4. Conserver la tension du secteur à la tension nominale.
5. La sortie du signal du générateur ne doit pas être plus élevée qu'il n'est nécessaire pour obtenir une lecture de sortie.
6. Utiliser un tournevis non-métallique pour la réglage.

N°	GÉNÉRA TEUR DU SIGNAL MA BRANCHEMENT	GÉNÉRA TEUR DU SIGNAL MA FRÉQUENCE	FRÉQUENCE D'AFFI-CHAGE	PRÉPARATIFS	ÉLÉMENTS RÉGLÉS	PROCÉDURE DE RÉGLAGE
			RÉGLAGE DE MA-RF			
1	Raccorder le générateur de signaux MA (modulation d'amplitude) à la borne d'antenne MA par l'intermédiaire d'un condensateur de 200pF, en se référant à la Fig. 9. (Entrée faible)	610kHz (modulé à 30% avec 400Hz)	610kHz	Branchez un voltmètre électronique à C.A. ou un oscilloscope à la borne du "haut-parleur" de l'appareil.	L201 (Bobine ANT)	1. Réglez pour un signal de sortie maximum. 2. Régler le noyau ferrite de L201 à l'aide d'un tournevis.
2		1500kHz (modulé à 30% avec 400Hz)	1500kHz	Branchez un voltmètre électronique à C.A. ou un oscilloscope à la borne du "haut-parleur" de l'appareil.	CT201 (Trimmer ANT)	1. Réglez pour un signal de sortie maximum. 2. Réfaire les étapes (1) et (2) jusqu'à ce que la fréquence s'aligne correctement avec l'affichage de la fréquence.

RÉGLAGE DE FM

- **Réglage et équipement untilisé.**
1. Générateur du signal FM (FM-SG).
2. Oscilloscope.
3. Voltmètres électroniques de courant continu (EVM).
4. Compteur de fréquence (19kHz et 108MHz mesurable).
5. Sélecteur . . . . de gamme de réglage sur la position "FM".
6. Régler le sélecteur de mode d'exploration automatique/FM sur la position "off/mono".
7. Les autres réglages sont les mêmes que pour la mise au point de l'amplitude modulée (AM).

* **Préparatifs du générateur de signaux à Modulation de Fréquence (FM-SG)**
L'entrée normale de l'appareil est de 60dB (1 mV), 400 Hz, modulation de 100%. (Du fait de l'atténuation, utiliser des câbles coaxiaux (IHF). La sortie du générateur de signaux devra être de plus de 6 dB. C'est-à-dire que lorsque l'entrée est de 60 dB, la sortie du générateur de signaux devra être de 66 dB).

N°	GÉNÉRATEUR DU SIGNAL FM BRANCHEMENT	GÉNÉRATEUR DU SIGNAL FM FRÉQUENCE	FREQUENCE D'AFFI-CHAGE	PRÉPARATIFS	ÉLÉMENTS RÉGLÉS	PROCÉDURE DE RÉGLAGE
			RÉGLAGE DE FI-FM			
3	Raccorder le générateur de signaux FM à la borne d'antenne FM en se référant à la Fig. 10. (Appliquer 60 dB à la borne d'antenne.)	100MHz (modulé à 100% avec 400Hz)	100MHz	Brancher le voltmètre électronique à C.C. entre TP201 et TP202 à travers la bobine de choc. (Voir la Fig. 10)	T202 (Transfo FI discri.)	1. Régler le noyau T202 de telle sorte que la tension mesurée dans le mode sans signal de mode soit de 0mV dans la plage des 300m V.
			RÉGLAGE DE RF-FM			
4	Raccorder le générateur de signaux FM à la borne d'antenne FM. (Entrée faible)	90MHz (modulé à 100% 400Hz)	90MHz	Branchez un oscilloscope sur les bornes du haut-parleur de l'appareil.	L105 (Bobine de OSC)	1. Réglez pour signal de sortie maximum. 2. Refaire les étapes (4) et (5).
5		106MHz (Modulé à 100% avec 400Hz)	106MHz	Branchez un oscilloscope sur les bornes du haut-parleur de l'appareil.	CT101 (Trimmer de OSC)	
			RÉGLAGE PILOTE MULTIPLEX FM			

EN UTILISANT UN COMETEUR DE FRÉQUENCES	EN UTILISANT UNE VARIANTE
6 1. Signal monophonique non modulé de 100MHz 60 dB appliqué à l'appareil. (Se référer à la Fig. 11) 2. Régler le sélecteur de mode d'exploration automatique/FM sur la position "on/auto". 3. Branchez le compteur de fréquences sur TP301 à travers une résistance (100kΩ). 4. Régler **VR301** sur 19kHz±30Hz.	1. Appliquez à l'appareil un signal stéréo provenant d'un générateur ou de la station stéréo an dispositif d'accord. 2. Régler **VR301** jusqu à ce que l'indicateur de stéréophonie s'éclaire. Collez le curseur de **VR301** comme indiqué sur la Fig. 12.

■ MEDICIONES Y AJUSTE

Nota: La bobina de OSC AM (L202) y IFT AM (T201) han sido yos ajustada y no requieren ajuste.

AJUSTE DE AM

* **Puesta y equipo usado**
1. Voltimetros electronicos de CA (EVM).
2. Generador de señales AM (AM-SG)
3. Poner selector FM-AM en posición "AM".
4. Mantener voltaje de línea a voltaje nominal.
5. La salida de generador de señales no debe ser mayor que la necesaria para obtener una lectura de salida.
6. Para el ajuste use un destornillador no metálico.

Nº	GENERADOR DE SEÑALES AM		FRECUENCIA DE PRESENTACION	PREPARACIONES	PIEZAS AJUSTADAS	PROCEDIMIENTO DE AJUSTE
	CONEXION	FRECUENCIA				
	AJUSTE RF-AM					
1	Conectar AM-SG a terminal de antena AM a través de capacitor 200pF refiriendo a Fig. 9. (Entrada débil)	610kHz (mod. 30% con 400Hz)	610kHz	Conectar EVM de CA u osciloscopio a terminales de "SPEAKER" (altavoz).	L201 (Bobina ANT)	1. Ajustar para salida máxima. 2. Ajustar núcleo de ferrita de L201 con destornillador.
2		1500kHz (Mod. 30% con 400Hz)	1500kHz	Conectar EVM de CA u osciloscopio a terminales de "SPEAKER" (altavoz).	CT201 (Trimer de ANT)	1. Adjustar par salida máxima. 2. Repetir pasos (1) y (2) hasta que la frecuencia se adapte correctamente a la presentación de frecuencia.

AJUSTE DE FM

* **Puesta y equipo usado**
1. Generador de señales FM (FM-SG)
2. Osciloscopio
3. Voltimetros electrónicos de CC (EVM).
4. Frequencimetro (19kHz y 108MHz medibles).
5. Poner selector de banda en posicion "FM".
6. Poner selector de exploración automática/modalidad FM en positión "off/mono".
7. Otras puestas son las mismas que en ajuste AM.

* **Preparación de generador de señales FM (FM-SG)**
1. La entrada standard del aparato es 60dB (1mV), 400Hz, modulación 100% (Debido a atenuación, usando cables coaxiales la salida SG ha de ser 6dB más. Es decir, cuando la entrada 60dB, la salida de SG ha de ser 66dB.)

Nº	FM GENERADOR DE SEÑALES		FRECUENCIA DE PRESENTACION	PREPARACIONES	PIEZAS AJUSTADAS	PROCEDIMIENTO DE AJUSTE
	CONEXION	FREQUENCIA				
	AJUSTE IF-FM					
3	Conectar SG-FM a terminal de antenna FM refiriendo a Fig. 10. (Aplicar 60dB a terminal de antena)	100MHz (Mod. 100% con 400Hz)	100MHz	Connector EVM CC entre terminal TP201 y TP202 a través de bobina de choque. (Referir a Fig. 10).	T202 (Discri. IFT)	1. Ajustar núcleo de T202 de manera que voltaje medido en modalidad de señal sea 0mV en gama de 300mV.
	AJUSTE RF-FM					
4	Conectar SG-FM a terminal de antenna FM. (Entrada débil)	90MHz (Mod. 100% con 400Hz)	90MHz	Conectar osciloscopio a terminales "speaker" (altavoz)	L105 (Bobina OSC)	1. Adjustar para salida máxima. 2. Repetir pasos (4) y (5).
5		106MHz (Mod. 100% con 400Hz)	106MHz	Conectar osciloscopio a terminales "speaker" (altavoz)	CT101 (Trimer de OSC)	

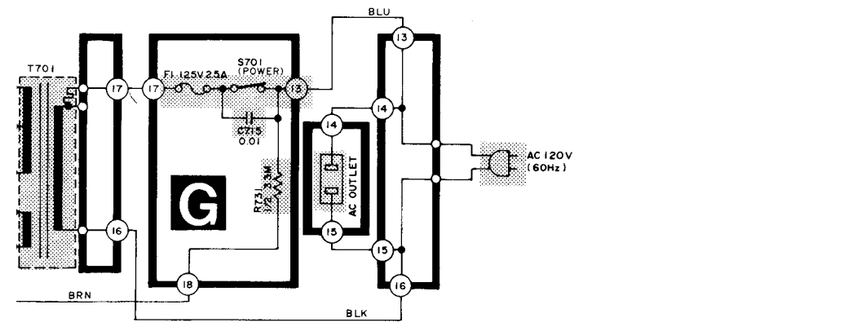
AJUSTE DE (V.C.O.) PILOTO MPX de FM

	USANDO UN FREQUENCIMETRO	USANDO SISTEMA ALTERNATIVO
6	1. Señal mono no modulada de 100. 10MHz 60dB aplicada al aparato. (Referir a Fig. 11) 2. Selector de exploración automática/modalidad FM en posición "on/auto". 3. Conectar frecuéncimetro a TP301 a través de resistor (100kΩ). 4. Ajustar VR301 a 19kHz±30Hz.	1. Aplicar una señal estereofónica de generador o estación estereofónica a sintonizador. 2. Ajustar VR301 hasta que el indicador estereofónico se ilumina, Fijar brazo de VR301 como mostrado en la Fig. 12.

■ SCHEMATIC DIAGRAM

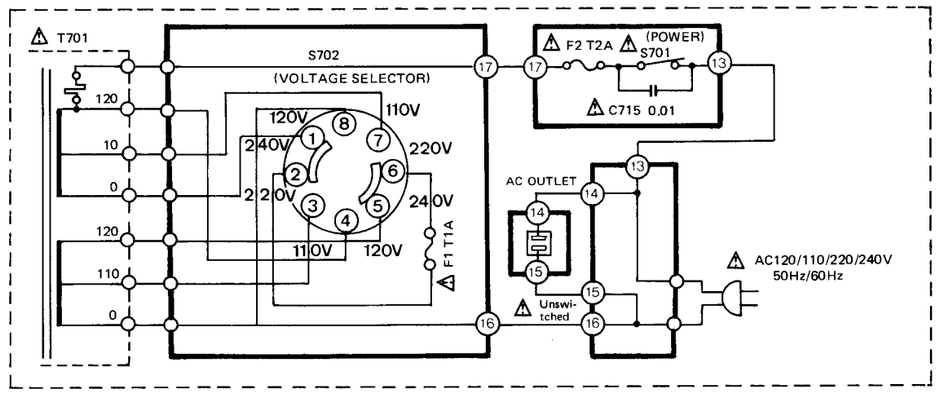
● **Change of power supply**

For [M] area

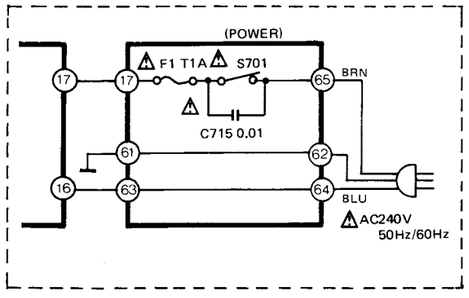


Change

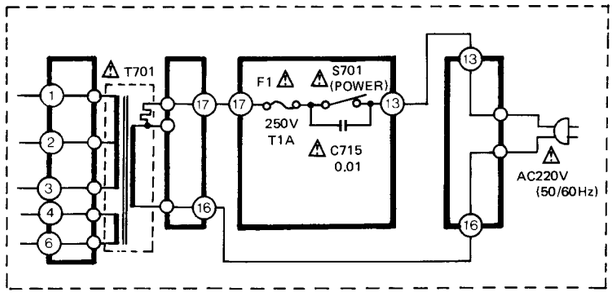
For [XA], [XM] areas



For [XL] area



For [EX, EH, Ei] areas

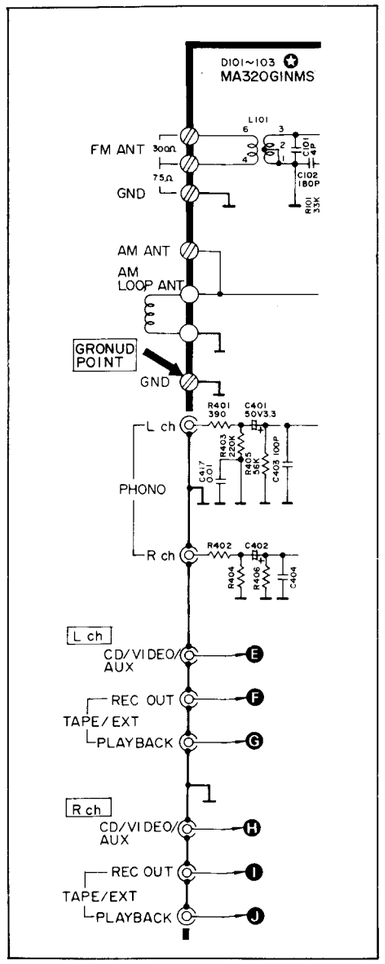


Important safety notice:

Components identified by ⚠ mark have special characteristics important for safety.
When replacing any of these components use only manufacturer's specified parts.

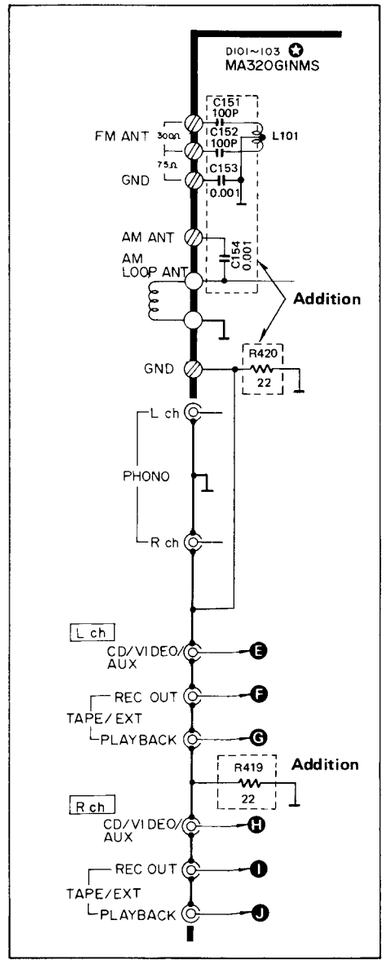
• Change of the antenna input circuit

For [M] area



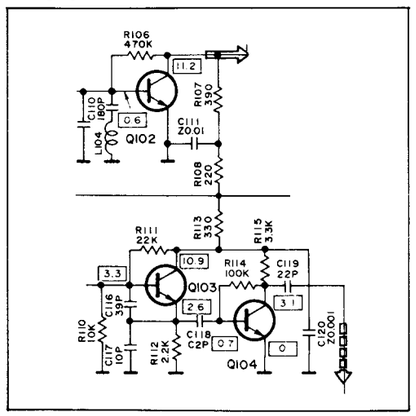
Change

For [XL] area



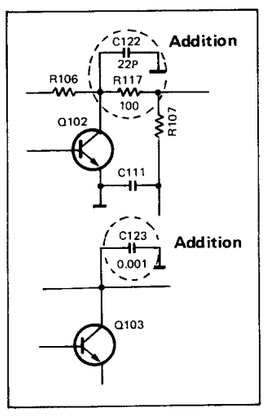
• Change of the capacitors (C122, 123) and resistor (R117)

For [M] area



Change

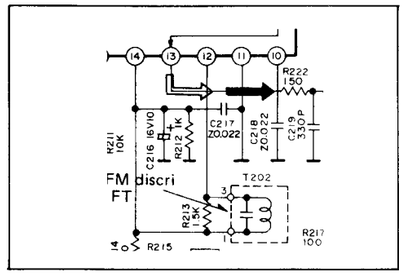
For [EX, EH, XA, XL, XM, Ei] area



Change

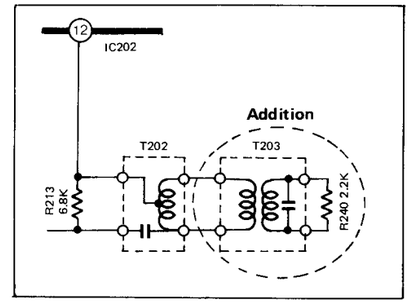
• Change of transformer (T203)

For [M] area



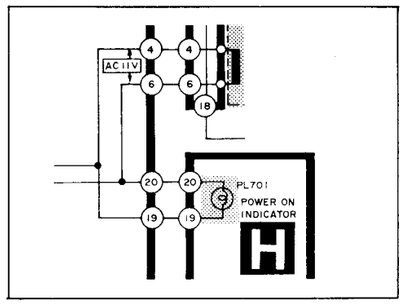
Change

For [EX, EH, XA, XL, XM, Ei] areas



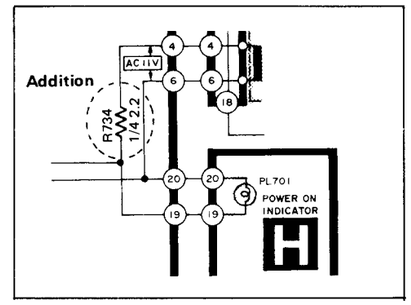
• Change of resistor (R734)

For [M] area



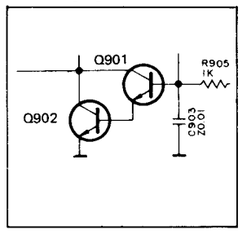
Change

For [EX, EH, XA, XL, XM, Ei] areas



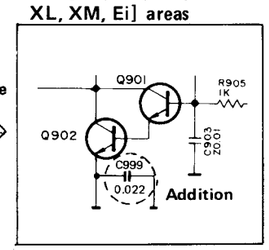
• Change of capacitor (C999)

For [M] area



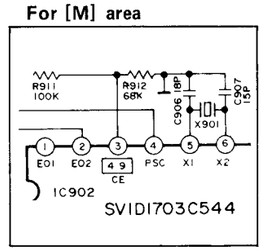
Change

For [EX, EH, XA, XL, XM, Ei] areas



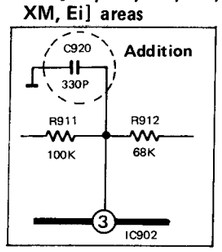
• Change of capacitor (C920)

For [M] area



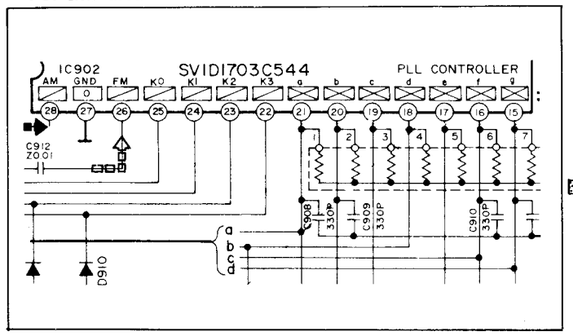
Change

For [EX, EH, XA, XL, XM, Ei] areas



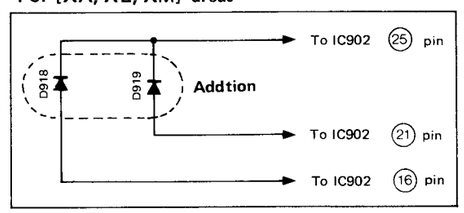
• Change of diodes (D918, D919)

For [M] area

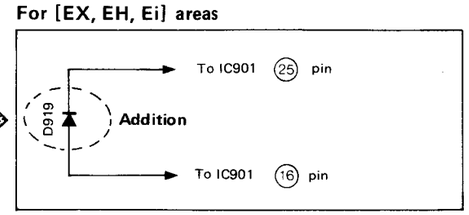


Change

For [XA, XL, XM] areas

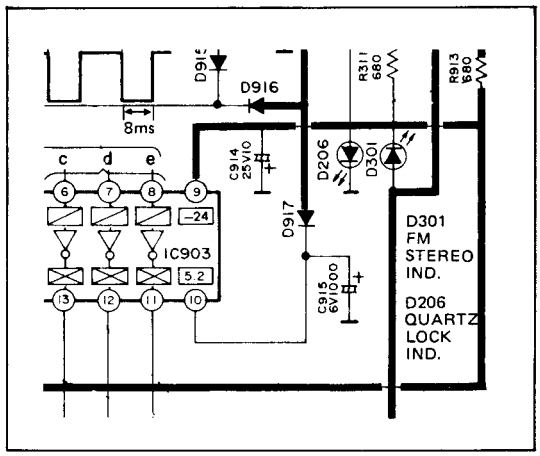


For [EX, EH, Ei] areas



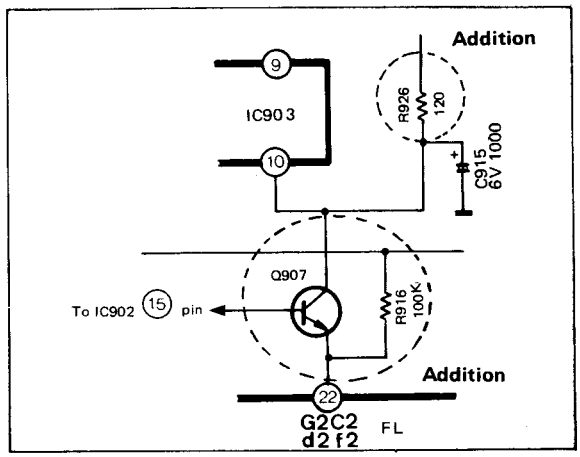
• C • Change of transistor (Q907) and resistors (R926, 916)

For [M] area



Change

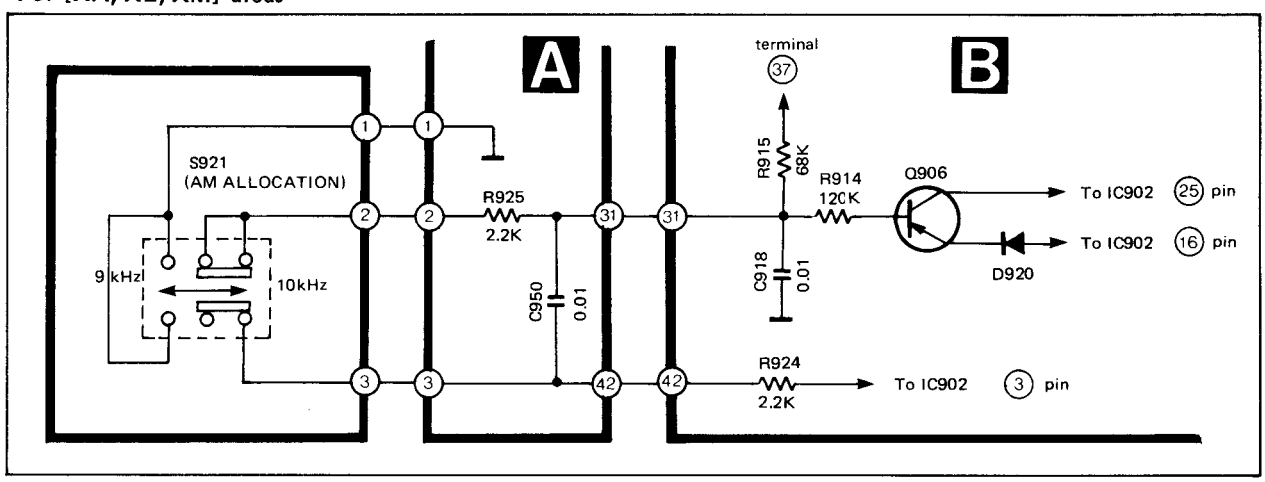
For [EX, EH, XA, XL, XM, Ei] areas



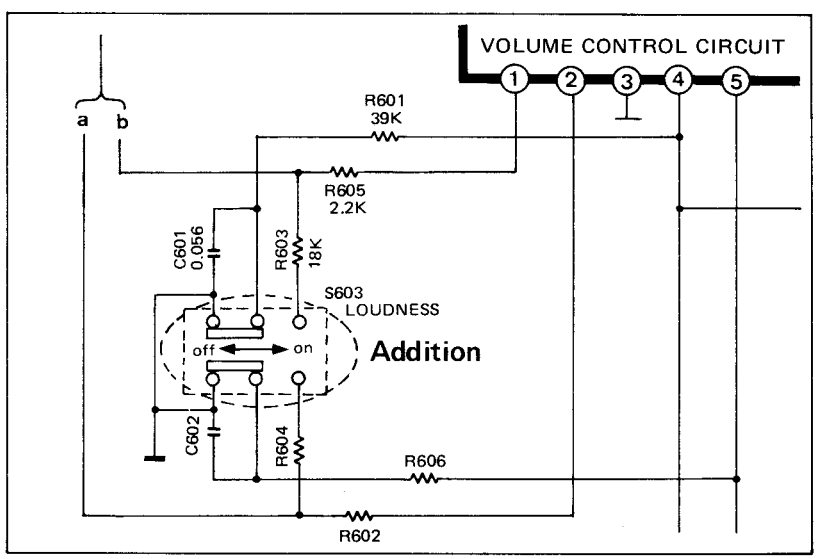
Addition

• Change of AM allocation switch

For [XA, XL, XM] areas

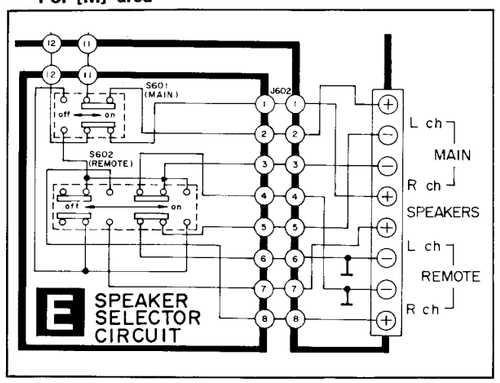


• Ch • Change of loudness switch (S603) For [EX, EH, XA, XL, XM, Ei] areas



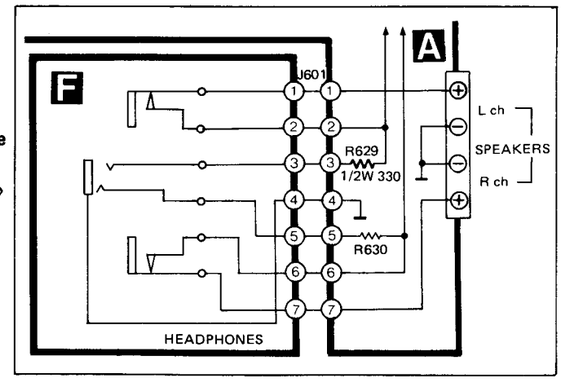
● **Change of speaker circuit**

For [M] area



Change

For [EX, EH, XA, XL, XM, Ei] areas



■ CHANGE IN REPLACEMENT PARTS LIST

Note: 1. Mentioned in this parts list are only those changed in Model No. SA-150 for destination [M] area.
2. Ⓚ – marked parts are used for black only, while ○– marked parts are for silver type only.
3. Part other than Ⓚ– and ○ – marked are used for both black and silver type.
4. Bracketed indications in Ref. No. Columns specify the area. Parts without these indications can be used for all areas.

Ref. No.	Change of Part No. SA-150 [M]	→ SA-150 [EX, EH, XA, XL, XM, Ei]	Area.	Part Name & Description
TRANSISTORS				
Q901, 902	2SC945-Q	2SD636Q		L.P.F.
Q906	Addition	2SB641R	[XA, XL, XM] only	
Q907	Addition	2SD636Q		
DIODES				
D912 ~ 916	Addition	SVD1S2473		
D918 919	Addition	SVDIS2473	[XA, XL, XM] only	
D919	Addition	SVDIS2473	[EX, EH, Ei] only	
D920	Addition	SVD1S2473	[XA, XL, XM] only	
D707 ~ 710	SVDSR1K2	SVDS2V20		Rectifier
TRANSFORMERS				
T701 ⚠	SLT5M365	SLT5M391	[EX,EH,Ei]	Power Source
		SLT5M393	[XL] only	Power Source
		SLT5M395	[XA,XM] only	Power Source
T203	Addition	SLI4B513-Z		FM IFT.
FUSE				
F1 ⚠	XBA1F25NU14	XBA2C10TR0		250V, T1A
F2 ⚠	Addition	XBA2C20TR0		250V, T2A
SWITCHES				
S601, 602	SSH2087	Deletion		Speakers Selector
S603	Addition	SSH1005		Loudness
S702 ⚠	Addition	ESE37219	[XA, XM]	Voltage Selector
S921	Addition	SSS43	[XA, XM, XL]	AM Allocation
RESISTORS				
R115 Ⓢ	ERD25TJ332	ERD25FJ102		Carbon, 1kΩ, ¼W
R117 Ⓢ	Addition	ERD25FJ101		Carbon, 100Ω, ¼W
R213 Ⓢ	ERD25FJ152	ERD25FJ682		Carbon 6.8kΩ, ¼W
R240 Ⓢ	Addition	ERD25FJ222		Carbon, 2.2kΩ, ¼W
R301 Ⓢ	ERD25FJ103	ERD25TJ273		Carbon, 27kΩ, ¼W
R305, 306 Ⓢ	ERD25FJ392	ERD25FJ332		Carbon, 3.3kΩ, ¼W
R309 Ⓢ	ERD25TJ274	ERD25TJ334		Carbon, 330kΩ, ¼W
R419, 420 Ⓢ	Addition	ERD25FJ220	[XL] only	Carbon, 22Ω, ¼W
R601, 602 Ⓢ	ERD25TJ473	ERD25TJ393		Carbon, 39kΩ, ¼W
R603, 604 Ⓢ	ERD25TJ823	ERD25TJ183		Carbon, 18kΩ, ¼W

Ref. No.	Change of Part No. SA-150 [M]	→ SA-150 [EX, EH, XA, XL, XM, Ei]	Area. Color	Part Name & Description
R625, 626	ERDS1FJ100	Deletion		———
R731	ERC12ZGK335	Deletion		———
R734	Addition	ERDS1FJ2R2		Carbon 2.2Ω, ¼W
R904	ERC12ZGK335	ERD25TJ335		Carbon, 3.3Ω, ¼W
R914 Ⓢ	Addition	ERD25TJ124	[XA, XL, XM] only	Carbon, 120kΩ, ¼W
R915 Ⓢ	Addition	ERD25TJ683	[XA, XL, XM] only	Carbon, 68kΩ, ¼W
R916 Ⓢ	Addition	ERD25TJ104		Carbon, 100kΩ, ¼W
R924, 925 Ⓢ	Addition	ERD25FJ222	[XA, XL, XM] only	Carbon, 2.2kΩ, ¼W
R926 Ⓢ	Addition	ERD25FJ121		Carbon, 120Ω, ¼W
CAPACITORS				
C119 Ⓢ	ECCD1H220K	ECKD1H103ZF		Ceramic, 0.01μF, 50V
C122 Ⓢ	Addition	ECCD1H220K		Ceramic, 22pF, 50V
C123 Ⓢ	Addition	ECKD1H102ZF		Ceramic, 0.001μF, 50V
C151 152	Addition	ECKDHS101MB	[XL] only	Ceramic, 100pF, AC400V
C153, 154	Addition	ECKDHS102MD	[XL] only	Ceramic, 0.001μF, AC400V
C305, 306	ECQM1H183KV	ECQM1H153KV		Polyester, 0.015μF, 50V
C515, 516	ECQM1H332KV	ECQM1H222KV		Polyester, 0.0022μF, 50V
C601, 602	ECQM1H333KV	ECQM1H563KV		Polyester, 0.056μF, 50V
C621, 622	ECKD1H473ZF	ECQM1H104KV		Polyester, 0.1μF, 50V
C705	ECQE104KN	ECQE1104KN		Polyester, 0.1μF, 125V
C709	ECKD1H103ZF	ECQM1H223KV		Polyester, 0.022μF, 50V
C920	Addition	ECKD1H331KB		Ceramic, 330pF, 50V
C950	Addition	ECKD1H103ZF		Ceramic, 0.01μF, 50V
C999	Addition	ECKD1H223ZF		Ceramic 0.022μF, 50V
CABINET AND CHASSIS PARTS				
1	SGWA150-SM	SGWA150-SM	○	Front Panel, Ass'y (1)
		SGWA150-KE	Ⓚ	Front Panel, Ass'y (1)
4	SDLA150-SM	SDLA150-SE	○	Cover, Indication Transparent (1)
		SDLA150-KE	Ⓚ	Cover, indication Transparent (1)
6	SGXA150-SM	SGXA150-SE	○	Front Sub Panel, Ass'y (1)
		SGXA150-KE	Ⓚ	Front Sub Panel, Ass'y (1)
7	SGX7669	SGX7669	○	Ornament (1)
		SGX7669-1	Ⓚ	Ornament (1)
8	SBD96	SBD96	○	Knob, Volume (1)
		SBD96-1	Ⓚ	Knob, Volume (1)
9	SBE295	SBE295A		Spacer, Volume knob (1)

Ref. No.	Change of Part No. SA-150 [M]	→ SA-150 [EX, EH, XA, XL, XM, Ei]	Area. Color	Part Name & Description
13	SHR9273	SHR9723		Slider, Volume knob (1)
18	SBD97	SBD97	○	Knob, Tone, Balance (3)
		SBD97-1	Ⓚ	Knob, Tone, Balance (3)
20	SGX7668	SGX7668	○	Ornament, Tone, Balance (3)
		SGX7668-1	Ⓚ	Ornament, Tone, Balance (3)
22	SBC565-IT	SBC565-3		Button (3)
25	SJJ71B	SJJ71E		Jack, Headphone (1)
26	SBC483-6T	Deletion		———
29	SJT345	SJT347		Holder, Fuse (2)
30	SMC1140	SMC1140-1		Shield Cover (1)
31	SKC1191S1	SKC1191S1	○	Cabinet (1)
		SKC1191BB1	Ⓚ	Cabinet (1)
35	SKUA150-SM	SKUA150-SX	[XA, XM] only	Bottom Board, Ass'y (1)
		SKUA150-SE	[other]	Bottom Board, Ass'y (1)
37	SJF4815-2	SJF4431-1		Terminal Board Speaker (1)
38	SGP6160A	SGP6160-1A	[EX, EH, Ei]	Terminal Board Speaker (1)
		SGP6160-4A	[XA, XM]	Rear Panel (1)
		SGP6160-5A	[XL]	Rear Panel (1)
43	SJS9232A	SJS9232A	[XA, XM] only	AC Outlet (1)
44	SJS9231A	SJS9231A	[EX, EH, Ei, XA, XM] only	Socket, AC Inlet (1)
49	Addition	SJS9232B	[XA, XM] only	Socket, AC Outlet (1)
50	Addition	SJS9231B	[EX, EX, Ei, XA, XM] only	Socket, AC Inlet (1)
51	Addition	SHR131	[XL] only	Bushing, AC Cord (1)
52	Addition	QFC1207MA	[XL] only	AC Cord (1)
53	Addition	SMX763-1	[EX, EH, Ei, XA, XM] only	Insulation Plate (1)
54	Addition	SHR415	[EX, EH, Ei, XA, XM] only	Lock Pin (1)

Ref. No.	Change of Part No. SA-150 [M]	→ SA-150 [EX, EH, XA, XL, XM, Ei]	Area. Color	Part Name & Description
SCREWS				
N6	SNE2095-4	SNE2095-4	○	(2)
		SNE2095-5	Ⓚ	(2)
N7	XTB3+8BFN	XTB3+8BFN	○	Tapping, ⊕ 3 x 8 (3)
		XTB3+8BFZ	Ⓚ	Tapping, ⊕ 3 x 8 (3)
N20	Addition	XTBS3+6FFZ1		Tapping with Detent, ⊕ 3 x 6 (1)
N21	Addition	XSN3+8BVS	[XA, XM] only	⊕ 3 x 8 (1)
N22	Addition	XSN26+5FZ	[XA, XM, XL] only	⊕ 2.6 x 5 (2)
WASHERS				
N30	Addition	XWA3B		Spring, φ3 (1)
N31	Addition	XWG3		Plain, φ3 (1)
N32	Addition	SHW40L150		(1)
N33	Addition	XWA26BFZ		Spring, φ2.6 (2)
ACCESSORIES				
A1 ⚠	SJA159	SJA168	[XA, XM] only	Cord, AC Power Source (1)
		SJA155	[EX, EH, Ei] only	Cord, AC Power Source (1)
A7	SQF12039	SQF12098	[XA, XM]	Instruction Book (1)
		SQF12099	[XL]	Instruction Book (1)
		SQF12097	[EX,EH,Ei]	Instruction Book (1)
A8 ⚠	Addition	SJP5213-1	[XA, XM] only	Plug, AC (1)
A9 ⚠	Addition	SJP5215	[XA, XM] only	Plug, AC (1)
PACKING PARTS				
P1	SPP699	SPP699	○	Polyethylene Bag (1)
		SPP649	Ⓚ	Polyethylene Bag (1)
P2	SPS4432	SPS4432-1	[XL] only	Pad, Left Side (1)
		SPS4432	[other]	Pad, Left Side (1)
P3	SPS4433	SPS4433-1	[XL] only	Pad, Right Side (1)
		SPS4433	[other]	Pad, Right Side (1)
P4	SPG4813	SPG4887	[XL] only	Carton Box (1)
		SPG4886	[other]	Carton Box (1)
P5	Addition	SGK1413	Ⓚ	Label (1)

■ REPLACEMENT PARTS LIST

Notes:
1. Part numbers are indicated on most mechanical parts. Please use this part number for parts order.
2. Important safety notice: Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
3. Ⓚ –marked parts are used for black only, while ○ –marked parts are for silver type only.
4. Part other than Ⓚ– and ○–marked are used for both black and silver type.
5. Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.
6. The " Ⓢ " mark is service standard parts and may differ from production parts.
7. The parenthesized numbers in the column of description stand for the quantity per set.

Areas

* [EX] is available in Scandinavia and Switzerland.
* [EH] is available in Holland.
* [XA] is available in Asia, Oceania, Africa and Middle Near East.
* [XL] is available in Australia.
* [XM] is available in Latin America.
* [Ei] is available in Italy.

Black type model No. SA-150(K)

Ref. No.	Part No.	Part Name & Description
INTEGRATED CIRCUITS		
IC201	AN278	FM IF Amp.
IC202	AN7273A	FM IF Det. & AM Converter
IC301	SVIUPC1161C3	AM AF Amp., FM MPX
IC401	AN6553F	Equalizer
IC601 ⚠	SVIK4141-2M	Power Amplifier
IC901	SVIUPB553AC	Pre-Scaler
IC902	SVID1703C544	PLL Controller (Micro-Computer)
IC903	AN6873N	FL Drive.
TRANSISTORS		
Q101	2SK241-GR	FM RF Amp.
Q102 Ⓢ	2SC1674-M	FM Mixer
Q103,104 Ⓢ	2SC1675-L	FM Oscillator, Buffer
Q201,202,204, 205,702,706, 707	2SC1815-Y	Buffer, Switching Muting, Regulator

Ref. No.	Part No.	Part Name & Description
Q203,701	2SA1015-Y	Switching
Q703,704	2SA992	Over Load Det.
Q705	2SD1265-0	Regulator
Q901,902,907	2SD636	L. P. F
Q903,904,905 906	2SB641R	Switching
DIODES		
D101,102,103	MA320G1-N	FM Variable Capacitor
D201	SVDKV1236Z	AM Variable Capacitor
D202	MA27W-A	
D203,204,205, 702,703,704, 799,901~904, 907~916	SVD1S2473	Switching
D206,301	LN846RP	L. E. D.(FM Stereo, Quartz Lock)
D701 ⚠	SVD1SR35200A	Rectifier

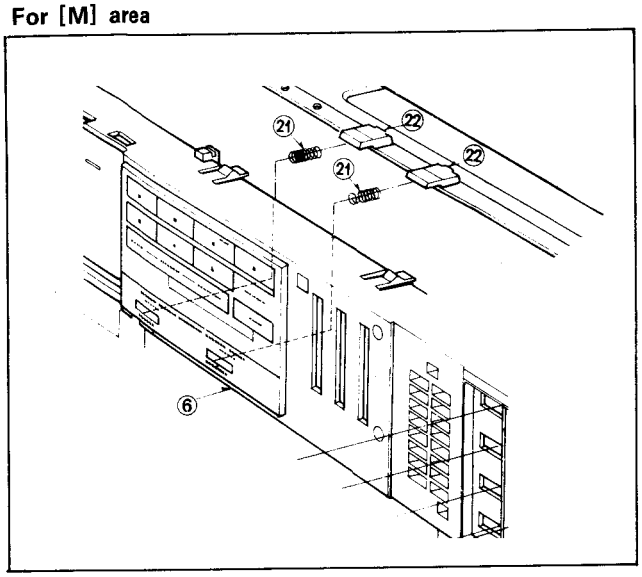
Ref. No.	Part No.	Part Name & Description
D705,706, Ⓢ 905,906	MA162A	Switching
D707~710 Ⓢ ⚠	SVDSR1K2	Rectifier
D711	MA1062M	Zener, 6.2V
D712,715	RD16EB	Zener, 16V
D713	MA1220L	Zener, 22V
D714	MA1068M	Zener, 6.8V
D716 Ⓢ	SVDRD8.2EB	Zener, 8.2V
D918,919 [XA, XL,XM] only	SVD1S2473	Switching
D920 [XA,XL, XM] only	SVD1S2473	Switching
COILS		
L101	SLA4N41	FM Antenna
L102,104	ELEPK1R2MA	Choke
L103	SLD4P87	FM Detector
L105	SL04N27-P	FM OSC
L201	SLA2B1-P	AM Antenna
L202	SL02B7-P	AM OSC
L601,602	SLQY07G-30	Choke

Ref. No.	Part No.	Part Name & Description
TRANSFORMERS		
T201	SLI2B101−M	AM IFT
T202	SLI4B511−Z	FM IFT
T203	SLI4B513−Z	FM IFT
T701[EX,EH,Ei] ⚠	SLT5M391	Power Source
T701[XL] ⚠	SLT5M393	Power Source
T701[XA,XM] ⚠	SLT5M395	Power Source
CERAMIC FILTERS		
CF201,202	SVFE107MS8A	FM, 10.7MHz (Red)
	SVFE107MS8B	FM, 10.68MHz (Blue)
	SVFE107MS8C	FM, 10.72MHz (Orange)
(Use pair ranks as same as CF 201 and CF202)		
CF203	SVFSFZ450F7L	AM, 450KHz
VARIABLE RESISTORS		
VR301	EVNE4AA00B53	FM MPX VCO Adjustment, 5KΩ (B)
VR501,502	EWANA6X05C15	Tone, 100KΩ(C)
VR601	EWANF5X05G15	Balance, 100KΩ(G)
VR602	EWAPBAX05B15	Volume, 100KΩ(B)
VARIABLE CAPACITORS		
CT101	ECRHA007A11	FM OSC
CT201	ECRHA010A11	AM Antenna
COMPONENT COMBINATIONS		
Z301,302	EXRP181K473C	180pF, 47KΩ
Z901	EXBP87104M	100KΩ(×7)
CRYSTAL		
X901	SVQ43U452−D	4.5MHz
FLUORESCENT DISPLAY TUBE		
FL	SAD7BT05A	
LAMP		
PL701 ⚠	XAMS6Q17	12V, 110mA
FUSES		
F1 ⚠	XBA2C10TR0	250V, T1A
F2 [XA,XM] only ⚠	XBA2C20TR0	250V, T2A
SWITCHES		
S201	SSH1160	FM/AM Band Selector
S202	SSH179	FM Mode
S501~504	SSH478	Input Selector
S603	SSH1005	Loudness
S701 ⚠	SSH1071	Power Source
S702 ⚠	ESE37219	Voltage Selector
S901~910	SSG13	Preset Tuning, Memory
S921 [XA,XL, XM] only	SSS43	AM Allocation
CABINET and CHASSIS PARTS		
1 ○	SGWA150−SM	Front Panel, Ass'y (Silver Type) (1)
1 Ⓚ	SGWA150−KE	Front Panel, Ass'y (Black Type) (1)
2	SBC573−1T	Button, Input Selector (1)
3	SGU409	Transparent Cover (1)
4 ○	SDLA150−SE	Cover, Indication Transparent (Silver Type) (1)
4 Ⓚ	SDLA150−KE	Cover, Indication Transparent (Black Type) (1)
5	SBC627	Button, Power Switch (1)
6 ○	SGXA150−SE	Front Sub Panel, Ass'y (Silver Type) (1)
6 Ⓚ	SGXA150−KE	Front Sub Panel, Ass'y (Black Type) (1)
7 ○	SGX7669	Ornament (Silver Type) (1)
7 Ⓚ	SGX7669−1	Ornament (Black Type) (1)
8 ○	SBD96	Knob, Volume (Silver Type) (1)
8 Ⓚ	SBD96−1	Knob, Volume (Black Type) (1)
9	SDE295A	Spacer, Volume (1)
10	SHR5274	Spacer, Volume (1)
11	SNE92	Bracket (1)
12	SUG183	Rod, Slider (2)
13	SHR9723	Slider, Volume Knob (1)
14	SHR322	Spacer (1)
15	SUS191−1	Spring, Button (4)
16	SHR9724	Holder (4)
17	SJT231	Terminal (1)
18 ○	SBD97	Knob, Tone, Balance (Silver Type) (3)
18 Ⓚ	SBD97−1	Knob, Tone, Balance (Black Type) (3)
19	SBZ9018	Holder, Knob (3)
20 ○	SGX7668	Ornament (Silver Type) (3)
20 Ⓚ	SGX7668−1	Ornament (Black Type) (3)
21	SUS257	Spring, Button (3)
22	SBC565−3	Button, Band, Mode, Loudness (3)
23	SMP373	Holder, L. E. D (1)
24	SMN1910	Bracket, FL (2)
25	SJJ71E	Jack, Headphone (1)
27	SMP377	Holder, Lamp (1)
28	SHR415	Lock Pin (10)
29	SJT347	Holder, Fuse (2)
30	SMC1140−1	Shield Cover (1)
31 ○	SKC1191S1	Cabinet (Silver Type) (1)
31 Ⓚ	SKC1191BB1	Cabinet (Black Type) (1)
32	SUW2832	Bracket, P. C. B. (1)
33	SME103−2	Bracket, P. C. B. (1)
34	SME103−3	Bracket, P. C. B. (1)
35 [XA,XM] only	SKUA150−SX	Bottom Board (1)
35 Other areas	SKUA150−SE	Bottom Board (1)
[35−1	[SKL245−2	Foot (4)
36	SJF8037−15N	Terminal Board (1)
CABINET and CHASSIS PARTS		
37	SJF4431−1	Terminal Board (Speaker) (1)
38 [EX,EH,Ei]	SGP6160−1A	Rear Panel (1)
38 [XA,XM]	SGP6160−4A	Rear Panel (1)
38 [XL]	SGP6160−5A	Rear Panel (1)
39	SJB3005−1	Case, Battery (1)
40	SGK1569−1	Label (1)
41	SJC7	Terminal (2)
42	SJC9	Terminal (2)
43 [XA,XM] only	SJS9232A	Cover, AC Outlet (1)
44 [EX,EH,XA, Ei,XM] only	SJS9231A	Cover, AC Inlet (1)
45	SHR301	Clamper (1)
46	SJT3611	Post (6Pin) (1)
46	SJT3213	Post (2Pin) (1)
47	SJS5629	Socket (6Pin) (1)
47	SJS5215	Socket (2Pin) (1)
48	SJT783	Terminal (8)
49 [XA,XM] only ⚠	SJS9232B	Socket, AC Outlet (1)
50 [EX,EH,XL, Ei,XM] only ⚠	SJS9231B	Socket, AC Inlet (1)
51 [XL] only	SHR131	Bushing, AC Cord (1)
52 [XL] only ⚠	QFC1207MA	AC Cord (1)
53 [EX,EH,XA, Ei,XM] only	SMX763−1	Insulation Plate (1)
54 [EX,EH,XA, Ei,XM] only	SHR415	Lock Pin (1)
SCREWS		
N1	XTBS3+8BFZ1	Tapping with Detent, ⊕3×8 (21)
N2 Ⓢ	XSN3+6S	⊕3×6 (4)
N3 Ⓢ	XTB3+8BFN	Tapping, ⊕3×8 (4)
N4 Ⓢ	XTB3+14BFN	Tapping, ⊕3×14 (2)
N5 Ⓢ	XTN3+8B	Tapping, ⊕3×8 (1)
N6 ○	SNE2095−4	(Silver Type) (2)
N6 Ⓚ	SNE2095−5	(Black Type) (2)
N7 Ⓢ○	XTB3+8BFN	Tapping, ⊕3×8 (Silver Type) (3)
N7 ⓈⓀ	XTB3+8BFZ	Tapping, ⊕3×8 (Black Type) (3)
N20	XTBS3+6FFZ1	Tapping with Detent, ⊕3×6 (1)
N21 [XA,XM] only Ⓢ	XSN3+8BVS	⊕3×8 (1)
N22 [XA,XL,XM] only	XSN26+5FZ	⊕2.6×5 (2)
WASHERS		
N10 Ⓢ	XWA3B	Spring, φ3 (4)
N11 Ⓢ	XWG3	Plain, φ3 (1)
N30 [XA,XM] only Ⓢ	XWA3B	Spring, φ3 (1)
N31 [XA,XM] only Ⓢ	XWG3	Plain, φ3 (1)
N32 [XA,XM] only	SHW40L150	Plain (1)
N33 [XA,XL,XM] only	XWA26BFZ	Spring, φ2.6 (2)
ACCESSORIES		
A1 [XA,XM] only ⚠	SJA168	AC Cord (1)
A1 [EX,EH,Ei] only ⚠	SJA155	AC Cord (1)
A2	SSA902	AM Loop Antenna (1)
A3	SMA231	Holder (1)
A4	SMA233−1	Holder (1)
A5	XTN3+10AFZ	Screw (2)
A6	SSA269	Cord, FM Antenna (1)
A7 [XA,XM]	SQF12098	Instruction Book (1)
A7 [XL]	SQF12099	Instruction Book (1)
A7 [EX,EH,Ei]	SQF12097	Instruction Book (1)
A8 [XA,XM] only ⚠	SJP5213−1	Plug, AC Adaptor (1)
A9 [XA,XM] only ⚠	SJP5215	Plug, AC Adaptor (1)
PACKING PARTS		
P1 ○	SPP699	Polyethylene Bag (Silver Type) (1)
P1 Ⓚ	SPP649	Polyethylene Bag (Black Type) (1)
P2 [XL] only	SPS4432−1	Pad, Left Side (1)
P2 Other areas	SPS4432	Pad, Left Side (1)
P3 [XL] only	SPS4433−1	Pad, Right Side (1)
P3 Other areas	SPS4433	Pad, Right Side (1)
P4 [XL] only	SPG4887	Carton Box (1)
P4 Other areas	SPG4886	Carton Box (1)
P5 Ⓚ	SGK1413	Label (2)

- Change of the exploded view

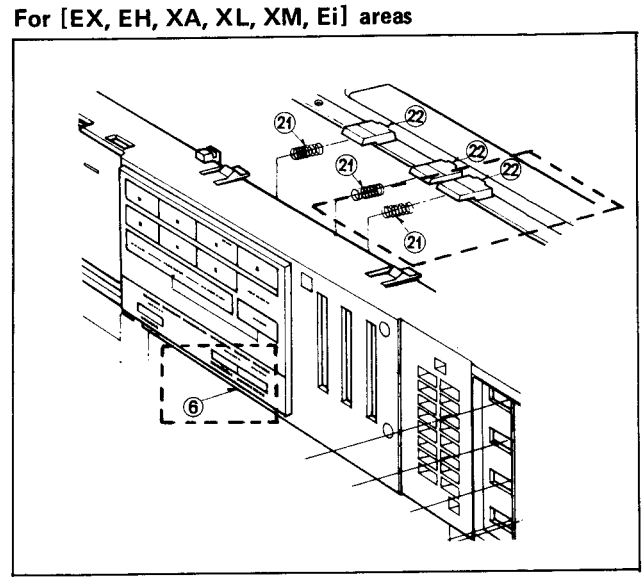
CHANGES

For [M] area

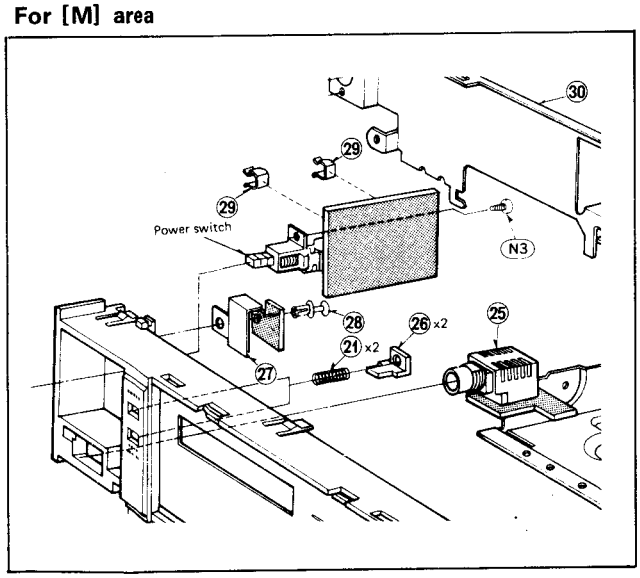


Change

For [EX, EH, XA, XL, XM, Ei] areas

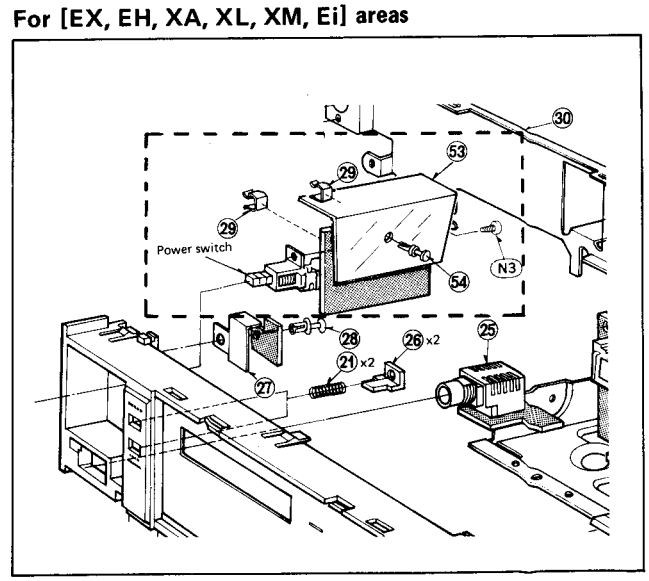


For [M] area

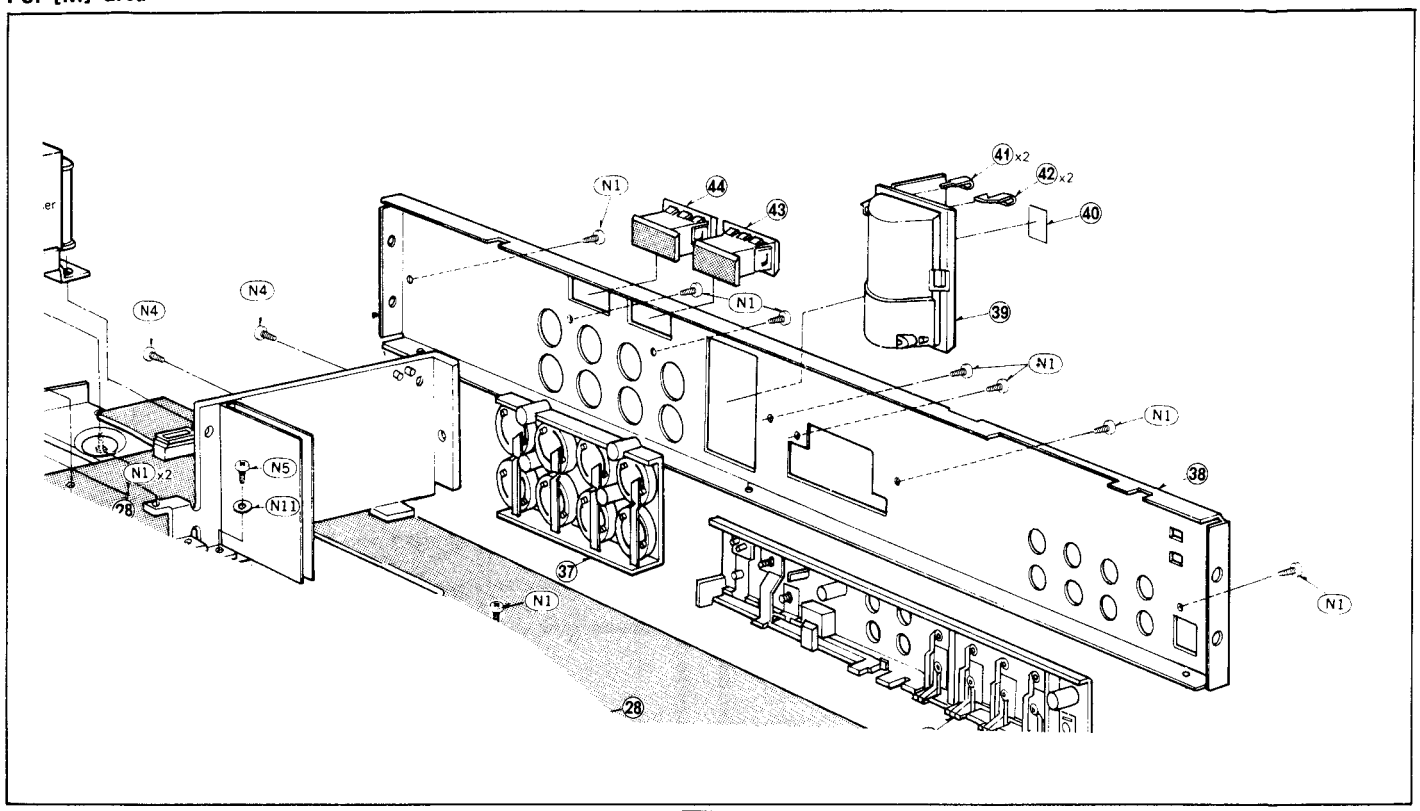


Change

For [EX, EH, XA, XL, XM, Ei] areas

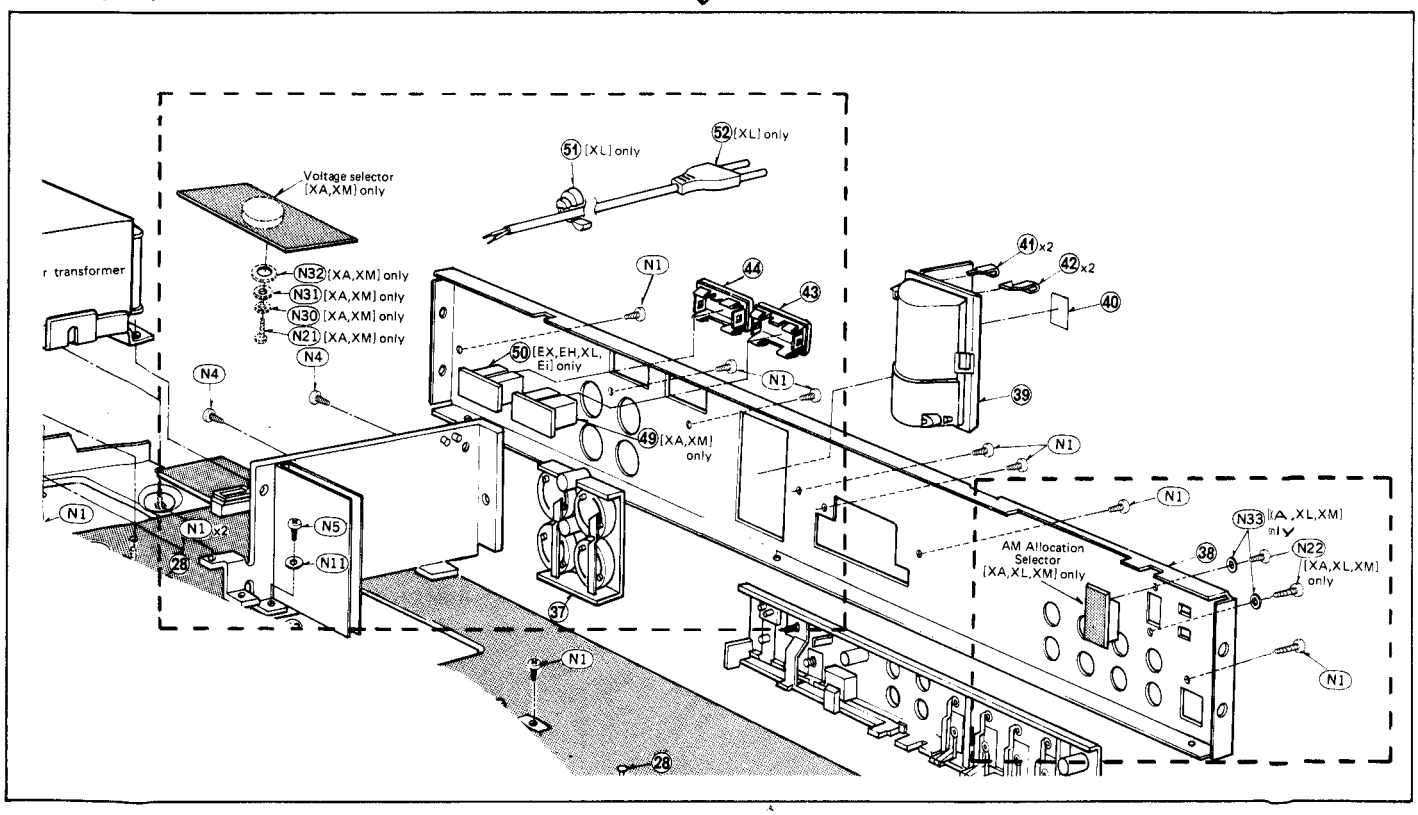


For [M] area



Change

For [EX, EH, XA, XL, XM, Ei] areas



Printed in Japan
84060-100 Ⓢ SH/TN

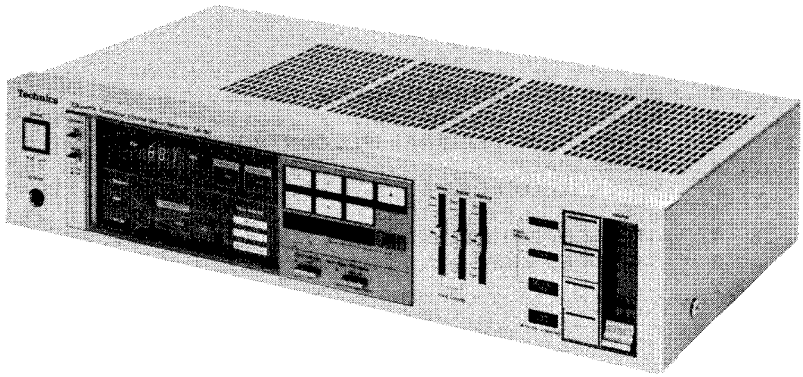
ORDER NO. HAD84022715C1

Service Manual

QUARTZ Synthesizer FM/AM Stereo Receiver

SA-150

[M], [MC]



Areas

* [M] is available in the U.S.A.
* [MC] is available in Canada.

Specifications

Specifications are subject to change without notice for further improvement.
Weights and dimensions shown are approximate.

(IHF '78)

■ AMPLIFIER SECTION

Rated minimum sine wave RMS power output
40 Hz~20 kHz both channels driven
0.5% total harmonic distortion
25W per channel (8 ohms)

1 kHz continuous power output	
both channels driven	
0.5% total harmonic distortion	
	27W per channel (8 ohms)
Dynamic headroom	1.2 dB (8 ohms)
Total harmonic distortion	
rated power at 40 Hz~20 kHz	0.5% (8 ohms)
rated power at 1 kHz	0.07% (8 ohms)
SMPTE intermodulation distortion	0.5% (8 ohms)
Frequency response	
PHONO	RIAA standard curve ±0.8 dB
CD/VIDEO/AUX, TAPE/EXT	5 Hz~70 kHz, −3 dB
Input sensitivity	
PHONO	0.5 mV (2.5 mV, IHF '66)
CD/VIDEO/AUX, TAPE/EXT	30 mV (150 mV, IHF '66)
S/N (IHF, A)	
PHONO	73 dB (71 dB, IHF '66)
CD/VIDEO/AUX, TAPE/EXT	82 dB (95 dB, IHF '66)
Maximum input voltage	
PHONO	140 mV (150 mV, 1 kHz)
Input impedance	
PHONO	47 kilohms
CD/VIDEO/AUX, TAPE/EXT	18 kilohms
Tone controls	
BASS	50 Hz, +10 dB~ −10 dB
TREBLE	20 kHz, +10 dB~ −10 dB
Loudness control (volume at −30 dB) (built-in)	
	50 Hz, +5 dB
Low frequency damping factor	30 (8 ohms)
Load impedance	
MAIN or REMOTE	8~16 ohms
MAIN and REMOTE	8~16 ohms

■ FM TUNER SECTION

Frequency range	87.9~107.9 MHz
Sensitivity	10.8 dBf (1.9 μV, IHF '58)
50 dB quieting sensitivity	
MONO	16.1 dBf (3.5 μV IHF '58)
STEREO	38.3 dBf (45 μV IHF '58)
Total harmonic distortion	
100 Hz	0.15% (MONO), 0.3% (STEREO)
1 kHz	0.15% (MONO), 0.3% (STEREO)
6 kHz	0.3% (MONO), 0.3% (STEREO)
S/N	
MONO	77 dB
STEREO	71 dB
Frequency response	20 Hz~15 kHz, +1 dB, −2 dB
Alternate channel selectivity	65 dB
Capture ratio	1 dB
Image rejection at 98 MHz	50 dB
IF rejection at 98 MHz	75 dB
Spurious response rejection at 98 MHz	82 dB
AM suppression	50 dB
Stereo separation	
1 kHz	40 dB
10 kHz	30 dB
Carrier leak	
19 kHz	−35 dB
38 kHz	−50 dB
Antenna terminals	300 ohms (balanced)
	75 ohms (unbalanced)

Technics

Matsushita Engineering and Service Company
50 Meadowland Parkway,
Secaucus,
New Jersey 07094

Panasonic Hawaii, Inc.
91-238 Kauhi St., Ewa Beach
P.O. Box 774
Honolulu, Hawaii 96808-0774

Matsushita Electric of Canada Limited
5770 Ambler Drive, Mississauga,
Ontario, L4W 2T3

Panasonic Sales Company Division of Matsushita Electric of Puerto Rico, Inc.
Ave, 65 De Infantería, KM 9.7
Victoria Industrial Park
Carolina, Puerto Rico 00630

■ AM TUNER SECTION

Frequency range	530~1620 kHz
Sensitivity	20 μV, 300 μV/m
Selectivity	55 dB
Image rejection at 1000 kHz	40 dB
IF rejection at 1000 kHz	60 dB

■ GENERAL

Power consumption	120W
Power supply	AC 120V, 60 Hz
Dimensions (W×H×D)	430 × 97 × 243 mm (16-15/16" × 3-13/16" × 9-9/16")
Weight	4.2 kg (9.3 lb.)

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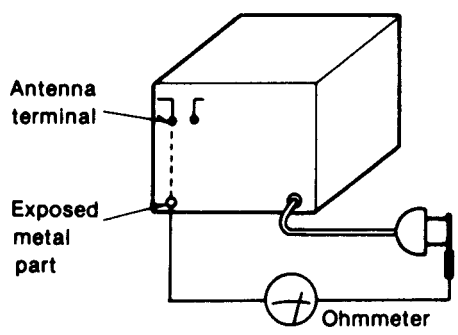
■ SAFETY PRECAUTION

1. Before servicing, unplug the power cord to prevent an electric shock.
2. When replacing parts, use only manufacturer's recommended components for safety.
3. Check the condition of the power cord. Replace if wear or damage is evident.
4. After servicing, be sure to restore the lead dress, insulation barriers, insulation papers, shields, etc.
5. Before returning the serviced equipment to the customer, be sure to make the following insulation resistance test to prevent the customer from being exposed to a shock hazard.

• INSULATION RESISTANCE TEST

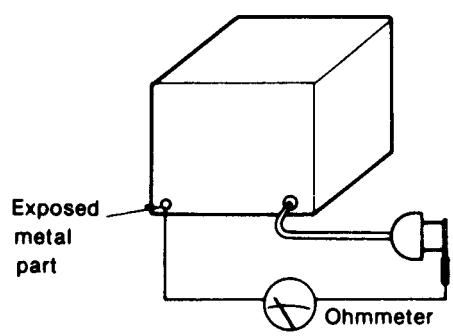
1. Unplug the power cord and short the two prongs of the plug with a jumper wire.
2. Turn on the power switch.
3. Measure the resistance value with ohmmeter between the jumpered AC plug and each exposed metal cabinet part, such as screwheads antenna, control shafts, handle brackets, etc. Equipment with antenna terminals should read between 3MΩ and 5.2MΩ to all exposed parts. (Fig. A) Equipment without antenna terminals should read approximately infinity to all exposed parts. (Fig. B)

Note: Some exposed parts may be isolated from the chassis by design. These will read infinity.



(Fig. A)

Resistance = 3MΩ—5.2MΩ

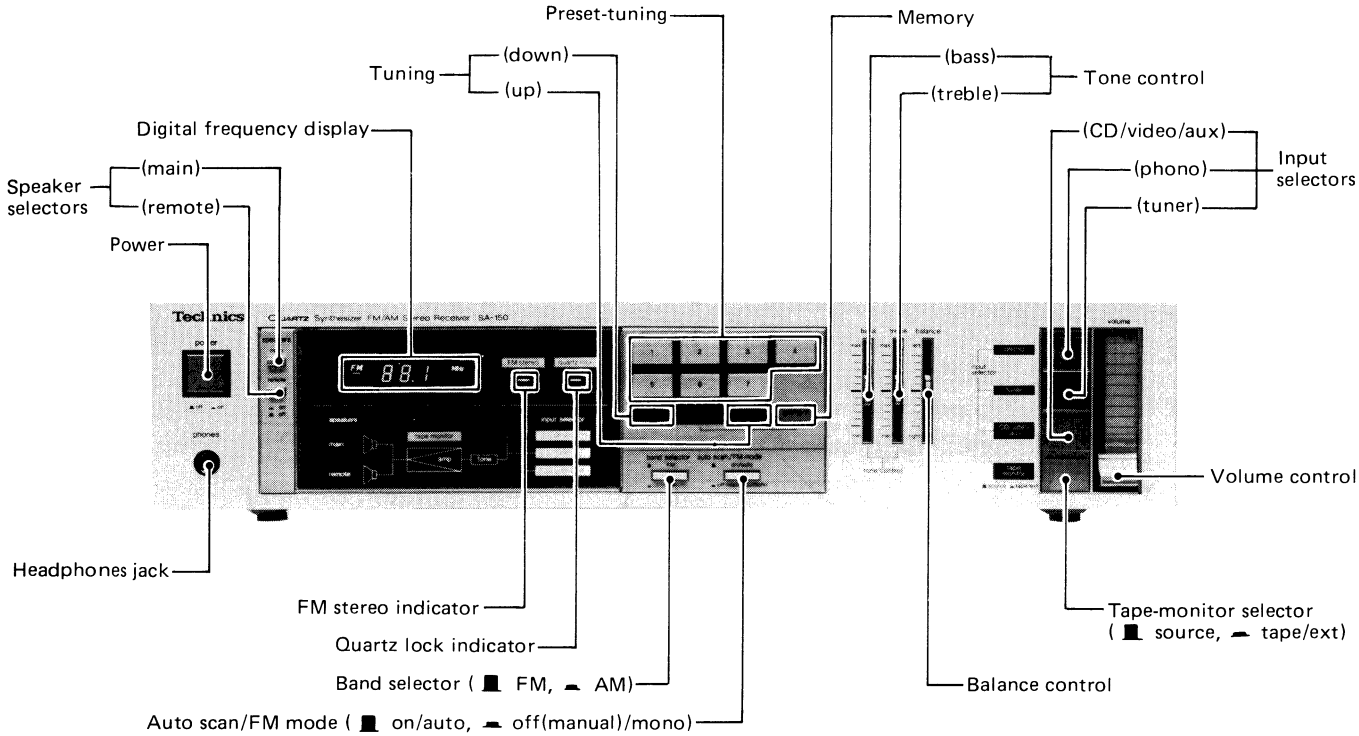


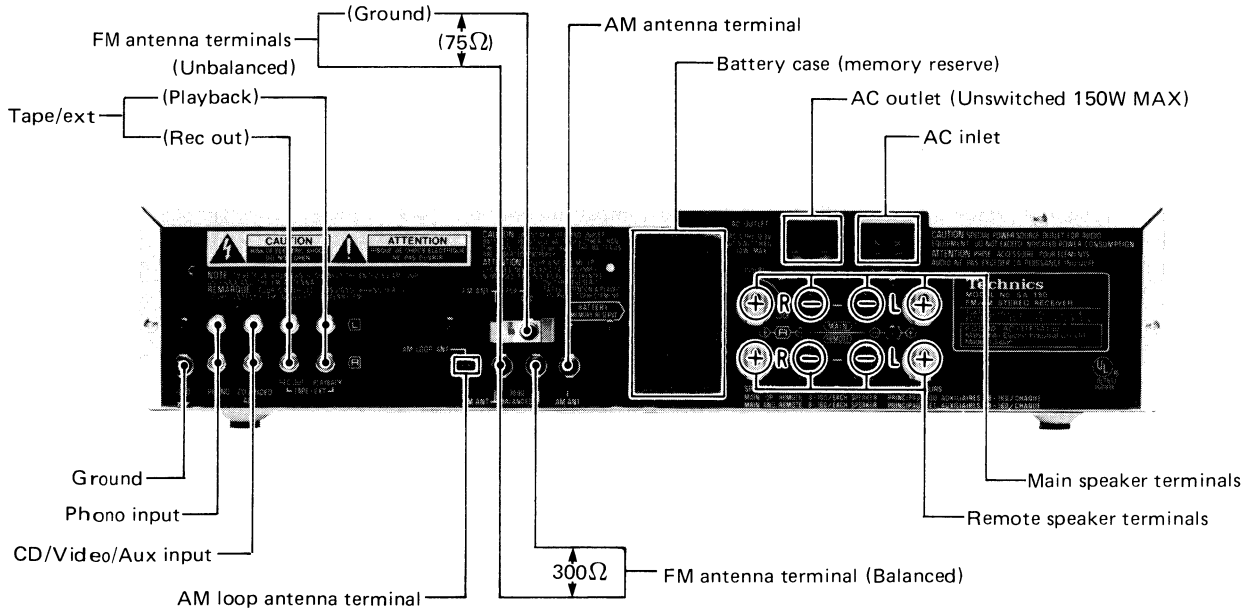
(Fig. B)

Resistance = Approx ∞

4. If the measurement is outside the specified limits, there is a possibility of a shock hazard. The equipment should be repaired and rechecked before it is returned to the customer.

■ LOCATION OF CONTROLS

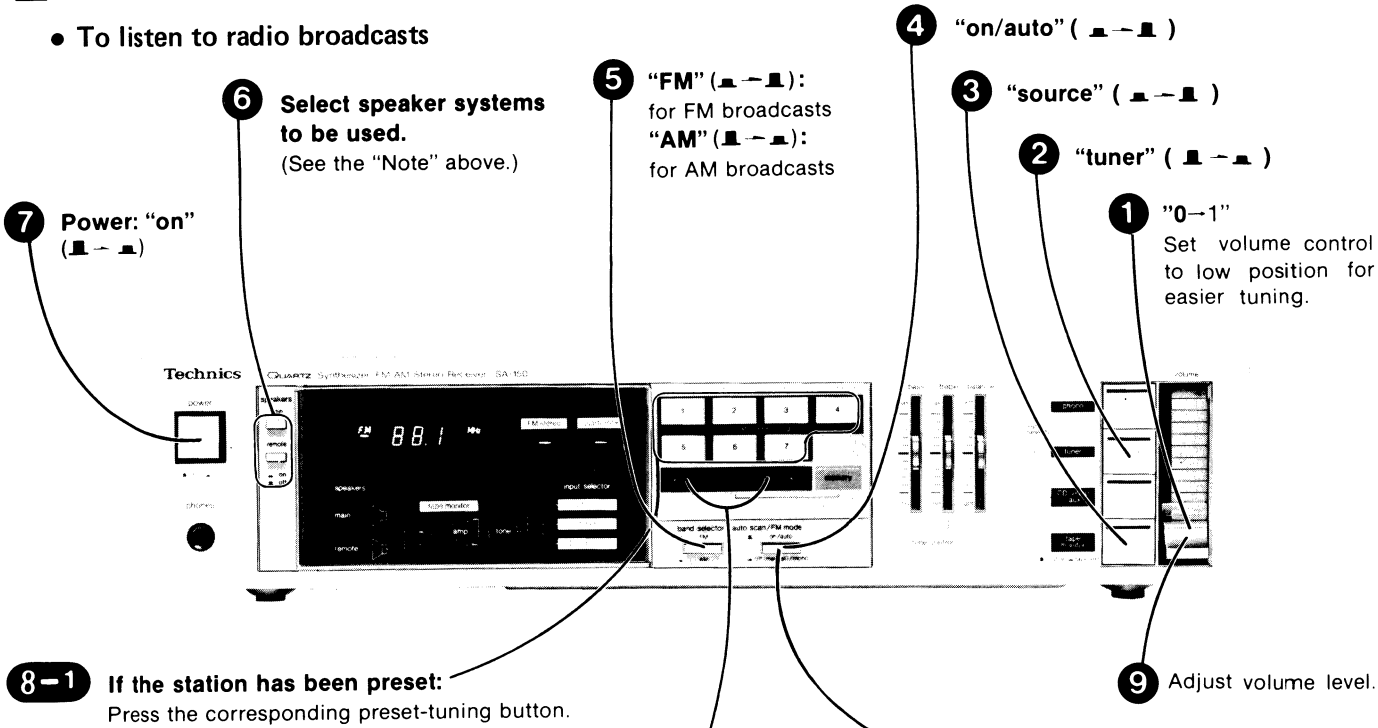




- Phono input capacitance is about 150pF.
- Series connection method is employed for the main and remote speaker connections of this set. Therefore, if both speaker changeover switches (main and remote) are turned "on" with the speaker unit connected only to main or remote speaker terminal, then no output signal will be delivered from the speaker unit.

■ OPERATION

- To listen to radio broadcasts


4 "on/auto" (▲—▲)
5 "FM" (▲—▲): for FM broadcasts "AM" (▲—▲): for AM broadcasts
3 "source" (▲—▲)
6 Select speaker systems to be used. (See the "Note" above.)
2 "tuner" (▲—▲)
1 "0→1" Set volume control to low position for easier tuning.
7 Power: "on" (▲—▲)
Technics
8-1 If the station has been preset: Press the corresponding preset-tuning button.
9 Adjust volume level.
8-2 Press one of the tuning buttons. (The broadcast station will automatically be selected.) Note: If automatic selection can not be made, set the automatic-scan/FM mode selector to the "off (manual)/mono" position and then tune manually.
If the broadcast signal is weak, or if there is a large amount of interference in a stereo broadcast, set to the "off (manual)/mono" position.

■ HOW TO ATTACH THE AM LOOP ANTENNA

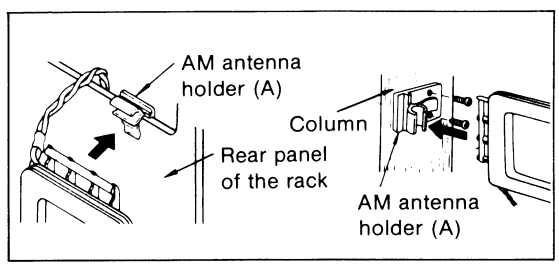
This unit includes an AM loop antenna. No outdoor antenna is necessary unless the broadcast signals in your area are especially weak. (Connect the loop antenna even if an outdoor antenna is used; if it is not connected, AM reception will not be possible.)

Pay attention to the following points when attaching the antenna.
1) Do not attach it horizontally (to do so would impair reception).
2) Do not attach it close to metal surfaces (to do so would result in noise).
3) Do not attach it close to power cords, speaker wires, etc. (to do so would result in noise).
4) Do not attach it close to a tape deck (when the tape deck is being used, chirping or beeping sounds may be received).

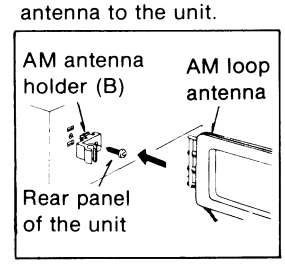
Steps

1. Connect the AM loop antenna to the AM antenna terminals located on the rear panel of the unit.
2. Find the height and direction of the antenna where reception is best and then fix it vertically to the wall, rack, etc.

1) When attaching the antenna to a wall, column or rack.



2) When attaching the antenna to the unit.



Note:
The installation of the antenna to the unit may cause impaired reception or result in signal noise. If possible, attach the antenna to the rack, a wall, or a column.

3. Move the antenna toward the right or left to find the point of best reception.

■ PROTECTION CIRCUITRY

The protection circuitry may have operated if eigher of the following conditions is noticed:

- No sound is heard when the power is turned on.
- Sound stops during performance.

The function of this circuitry is to prevent circuitry damage if, for example, the positive and negative speaker with an impedance less than the indicated rated impedance of the amplifier are used.

If this occurs, follow the procedure outlined below:

1. Turn off the power.
2. Determine the cause of the problem and correct it.
3. Turn on the power once again

Note:
When the protection circuitry functions the unit will not operate unless the power is first turned off and then on again.

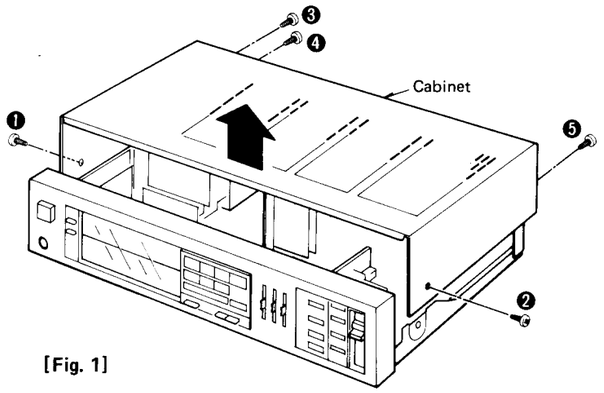
■ BEFORE REPAIR AND ADJUSTMENT

1. Turn off the power supply and short-circuit of the power supply capacitors (C706, C707, 4700μF) with a resistor (about 10Ω, 5W) to discharge the charged voltage. Do not short both ends of C706 and C707 with a screwdriver. It may damage the component.
2. Before turning on the power supply after completion of repair, slowly apply the primary voltage by using a power supply voltage controller to make sure that the consumed current at 120V, 60Hz in no-signal mode is 100 ~ 400mA.

■ DISASSEMBLY INSTRUCTIONS

• How to remove the cabinet

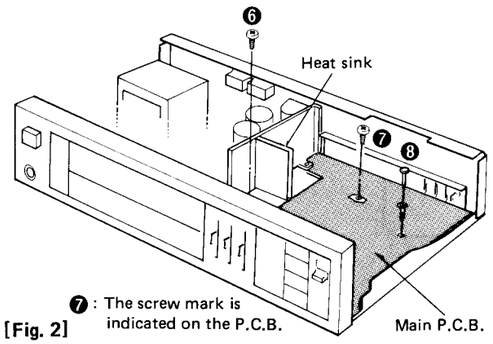
1. Remove the 2 setscrews (Fig. 1: ❶, ❷) on the side and 3 setscrews (Fig. 1: ❸ ~ ❺) on the back of the cabinet.
2. Remove the cabinet upward.



[Fig. 1]

• How to remove the bottom board

1. Remove the 2 setscrews (Fig. 2: ❻, ❼) and 1 lock pin (Fig. 2: ❽) of the main P.C.B. and heat sink.
2. Remove the 8 setscrews (Fig. 3: ❾ ~ ⓰) of the bottom board.
3. Remove the bottom board upward.



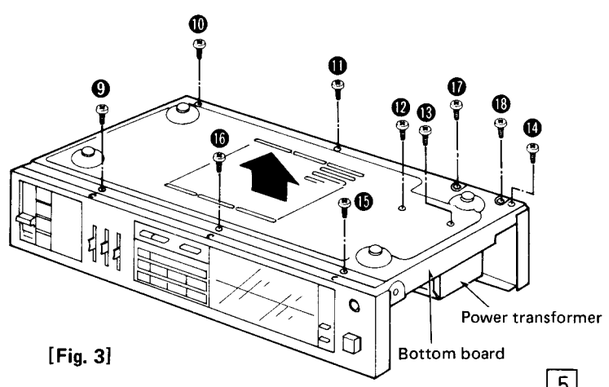
[Fig. 2]

• How to remove the power amplifier IC

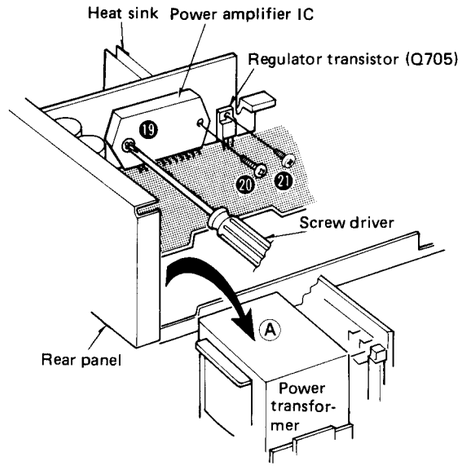
1. Remove the cabinet and bottom board.
2. Remove the 2 setscrews (Fig. 3: ⓱, ⓲) of the power transformer.
3. Detach the power transformer from rear panel in the direction of arrow Ⓐ (Fig. 4).
4. Unsolder of power amplifier IC.
5. Remove the 2 setscrews (Fig. 4: ⓳, ⓴) used to secure the power amplifier IC on the heat sink, and then pull the power amplifier IC.
6. When mounting the power amplifier IC, apply silicone compound (SZZ0L15) to the rear side of power amplifier IC, and then follow the steps 1 ~ 5 reversely.

• How to remove the regulator transistor (Q705)

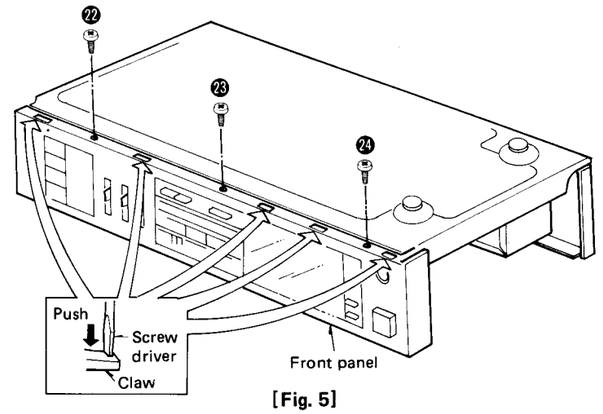
1. Remove the cabinet and bottom board.
2. Unsolder of regulator transistor (Q705).
3. Remove the 1 setscrews (Fig. 4: ㉑).
4. When mounting the regulator transistor, apply silicone compound (SZZ0L15) to the rear side of regulator transistor, and the follow the steps 1 ~ 3 reversely.



[Fig. 3]



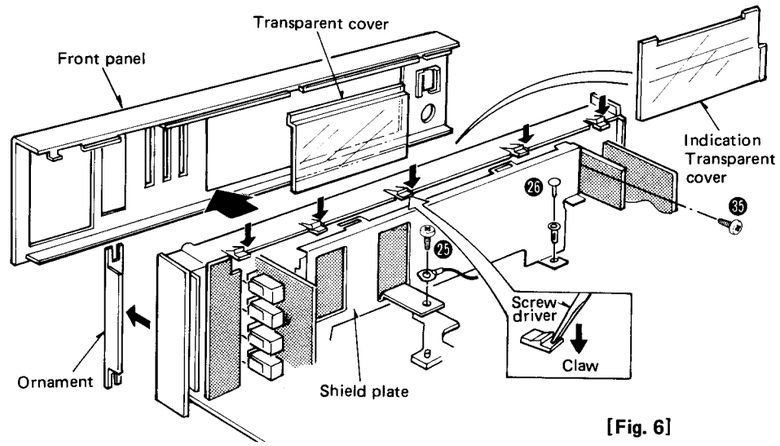
[Fig. 4]



[Fig. 5]

• How to remove the front panel

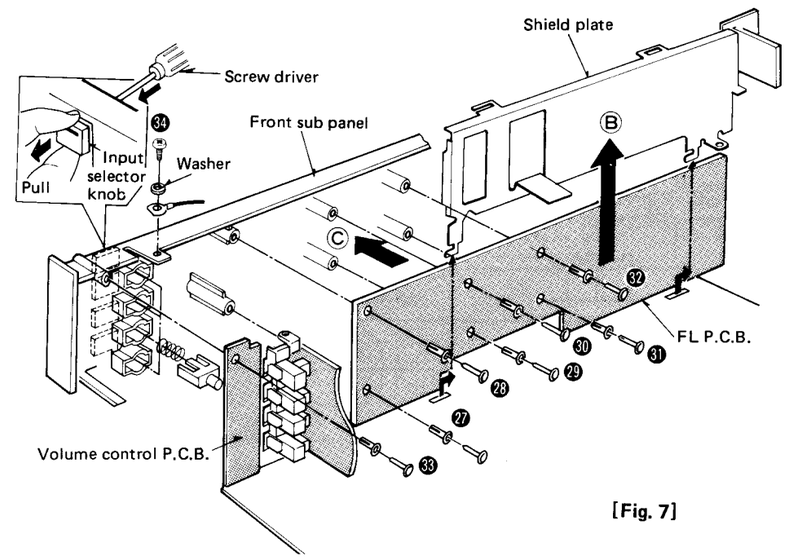
1. Remove the cabinet.
2. Remove the 3 setscrews (Fig. 5: ㉒ ~ ㉔) of the front panel.
3. Release the 5 claws (Fig. 5) at the under of the front panel grille and 5 claws (Fig. 6) at the top of the front panel grille, and then remove the front panel.



[Fig. 6]

• How to remove the front sub panel

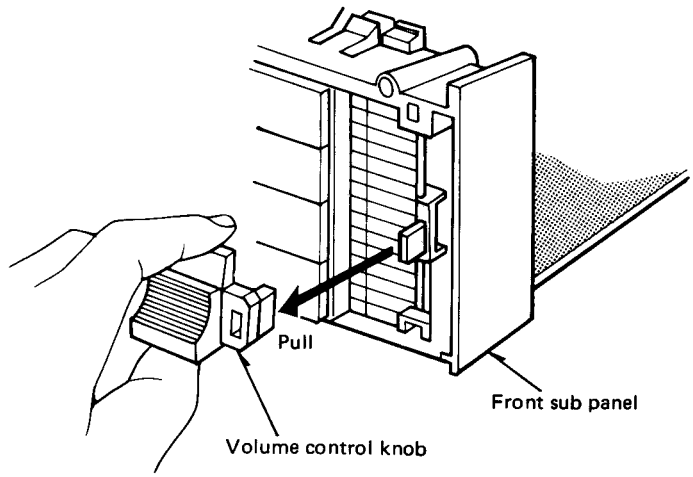
1. Remove the cabinet and front panel.
2. Remove the 2 setscrews (Fig. 6: ㉕, ㉟) and 1 lock pin (Fig. 6: ㉖).
3. Remove the shield plate in the direction of the arrow Ⓑ (Fig. 7).
4. Remove the 6 lock pins (Fig. 7: ㉗ ~ ㉜) of the FL P.C.B.
5. Remove the 1 lock pin (Fig. 7: ㉝) of the volume control P.C.B.
6. Remove the 4 knobs (Fig. 7).
7. Remove the 1 setscrew (Fig. 7: ㉞) at the top of the front sub panel grille.
8. Remove the front sub panel in the direction of the arrow Ⓒ (Fig. 7).



[Fig. 7]

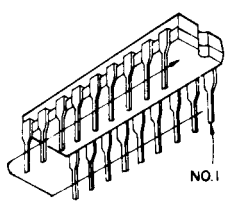
• How to remove the volume control knob

1. Remove the cabinet and front panel.
2. Pull out the volume control knob (Fig. 8).



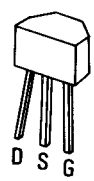
[Fig. 8]

TERMINAL GUIDE OF TRANSISTORS, DIODES AND IC'S

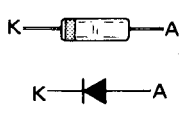


AN6873N	18pin
AN7273A	
SVID1703C544	28pin
SVIμPB553C-E	8pin
AN6553F	
SVINJ4558DSM	
SVIμPC1161C3	16pin

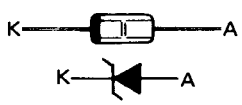
2SK241



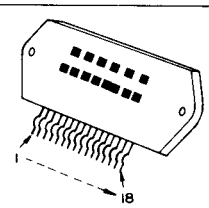
SVDIS2473
MA27W–A



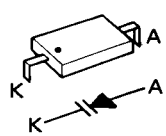
SVDISR35200A, MA1082
MA1062M, MA1160M
MA1220L, MA1068M



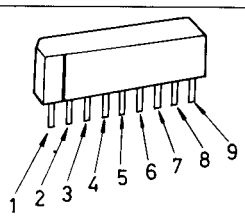
SVIK4141–2M



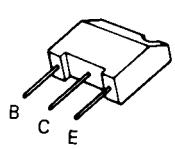
MA320G1NMS



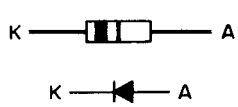
AN278



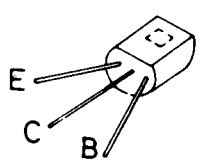
2SB641



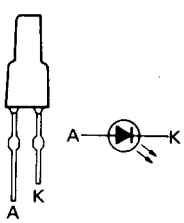
MA162



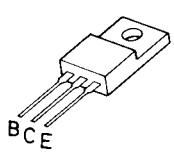
2SA1015, 2SA992
2SC1674, 2SC945
2SC1815, 2SC1675



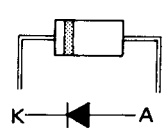
LN846RP



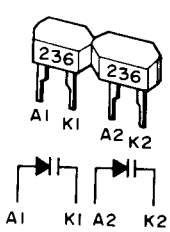
2SD1265



SVDSR1K2



SVDKV1236Z



■ MEASUREMENTS AND ADJUSTMENTS

Note: AM OSC coil (L202) and AM IFT (T201) have been already adjusted, and require no adjustment.

AM ADJUSTMENT

*** Setting and Equipment used**
1. AC electronic voltmeters (VTVM)
2. AM signal generator (AM-SG)
3. Set band selector to "AM" position.
4. Maintain line voltage at 120 volts.
5. Output of signal generator should be no higher than necessary to obtain an output reading.
6. Use a non-metal screwdriver for the adjustment.

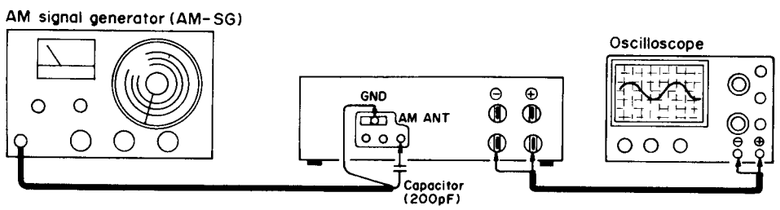
Step No.	AM SIGNAL GENERATOR CONNECTION	AM SIGNAL GENERATOR FREQUENCY	DISPLAY FREQUENCY	PREPARATIONS	PARTS ADJUSTED	ADJUSTING PROCEDURE
	AM-RF ADJUSTMENT					
1	Connect AM-SG to AM antenna terminal through 200pF capacitor referring to Fig. 9.. (Weak input)	610kHz (30% Mod. with 400Hz)	610kHz	Connect AC VTVM or scope to "speaker" terminal of the set.	L201 (ANT Coil)	1. Adjust for maximum output. 2. Adjust core of L201 by screw-driver.
2		1500kHz (30% Mod. with 400Hz	1500kHz	Connect AC VTVM or scope to "speaker" terminal of the set.	CT201 (ANT Trimmer)	1. Adjust for maximum output. 2. Repeat steps (1) and (2) until the frequency correctly matches the frequency display.

FM ADJUSTMENT

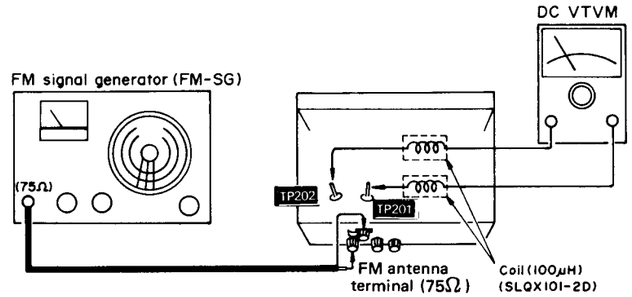
*** Setting and Equipment used**
1. FM signal generator (FM-SG)
2. Oscilloscope.
3. DC electronic voltmeters (VTVM).
4. Frequency counter (19kHz and 108MHz measurable).
5. Set band selector to "FM" position.
6. Set automatic-scan/FM mode selectot to "off/mono" position.
7. Other setting are the same as in AM adjustment.

*** Preparation of FM signal generator (FM-SG)**
1. The standard input of the set is 60dB(1mV), 400Hz 100% modulation.
(Because of attenuation, using coaxial cables. SG output must be 6dB plus (IHF). That is, when input 60dB, SG output is to be 66dB.)

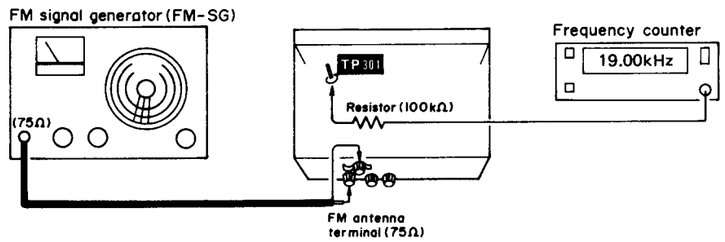
Step No.	FM SIGNAL GENERATOR CONNECTION	FM SIGNAL GENERATOR FREQUENCY	DISPLAY FREQUENCY	PREPARATIONS	PARTS ADJUSTED	ADJUSTING PROCEDURE
	FM-IF ADJUSTMENT					
3	Connect FM-SG to FM antenna terminal referring to Fig. 10. (Apply 60dB to antenna terminal)	100.0MHz (100% Mod. with 400Hz)	100.0MHz	Connect DC VTVM to between TP201 and TP202 through choke coil (Refer to Fig. 10)	T202 (Discri. IFT)	1. Adjust T202 core so that voltage measured in signal mode is 0mV in 300mV range.
	FM-RF ADJUSTMENT					
4	Connect FM-SG to FM antenna terminal. (Weak input)	90 MHz (100% Mod. with 400 Hz)	90 MHz	Connect scope to "Speaker" terminals of the set.	L105 (OSC Coil)	1. Adjust for maximum output. 2. Repeat steps (4) and (5).
5		106 MHz (100% Mod. with 400 Hz)	106 MHz	Connect scope to "Speaker" terminals of the set.	CT101 (OSC Trimmer)	
	FM MPX PILOT (VCO) ADJUSTMENT					
	USING A FREQUENCY COUNTER			**USING ALTERNATE SYSTEM**		
6	1. 100.0 MHz 60 dB Non-modulated mono signal applied to set. (Refer to Fig. 11) 2. Set automatic-scan/FM mode selector to "on/auto" position. 3. Connect frequency counter to TP301 through resistor (100kΩ). 4. Adjust **VR301** to 19kHz ± 30Hz.			1. Apply stereo signal from generator or stereo station to tuner. 2. Adjust **VR301** until stereo indicator lights up. Cement arm of **VR301** as shown in Fig. 12.		



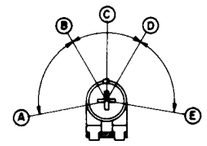
[Fig. 9]
AM-RF adjustment



[Fig. 10]
FM-IF adjustment



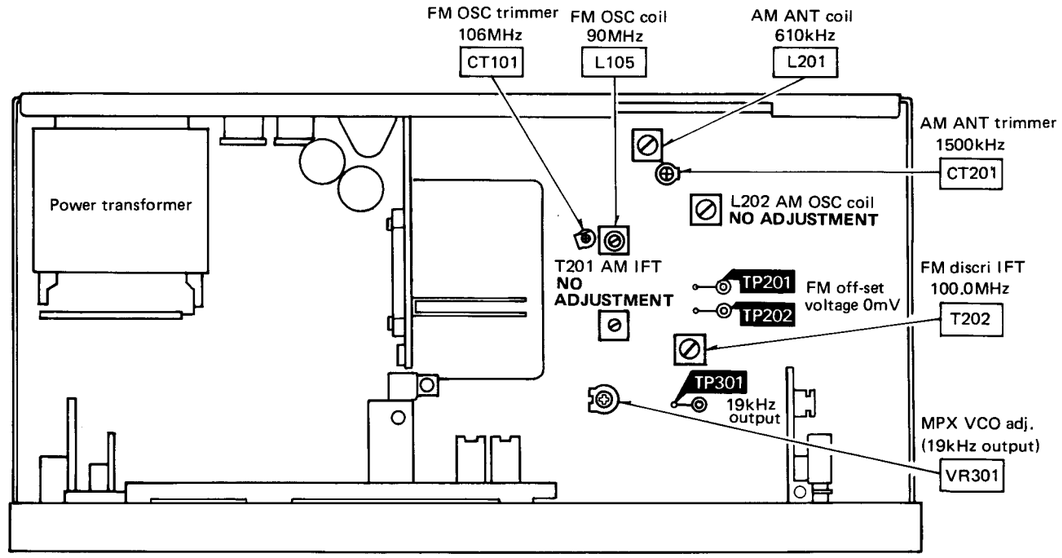
[Fig. 11]
FM MPX PILOT (VCO) adjustment



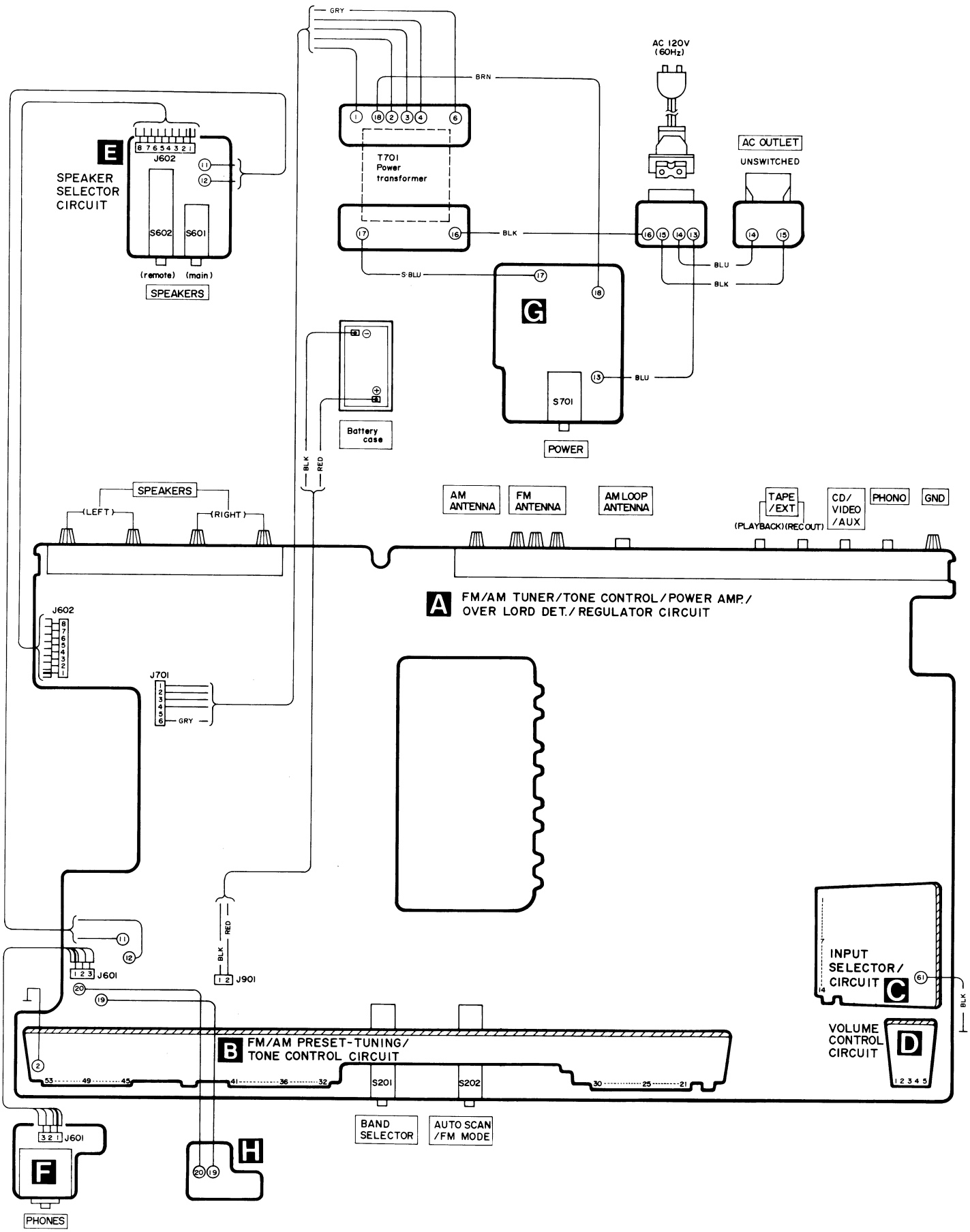
A–B, D–E Stereo OFF Position.
B–D Stereo ON Position. (indicator Lighting)
C Adjust Point of Pilot Circuit.

[Fig. 12]

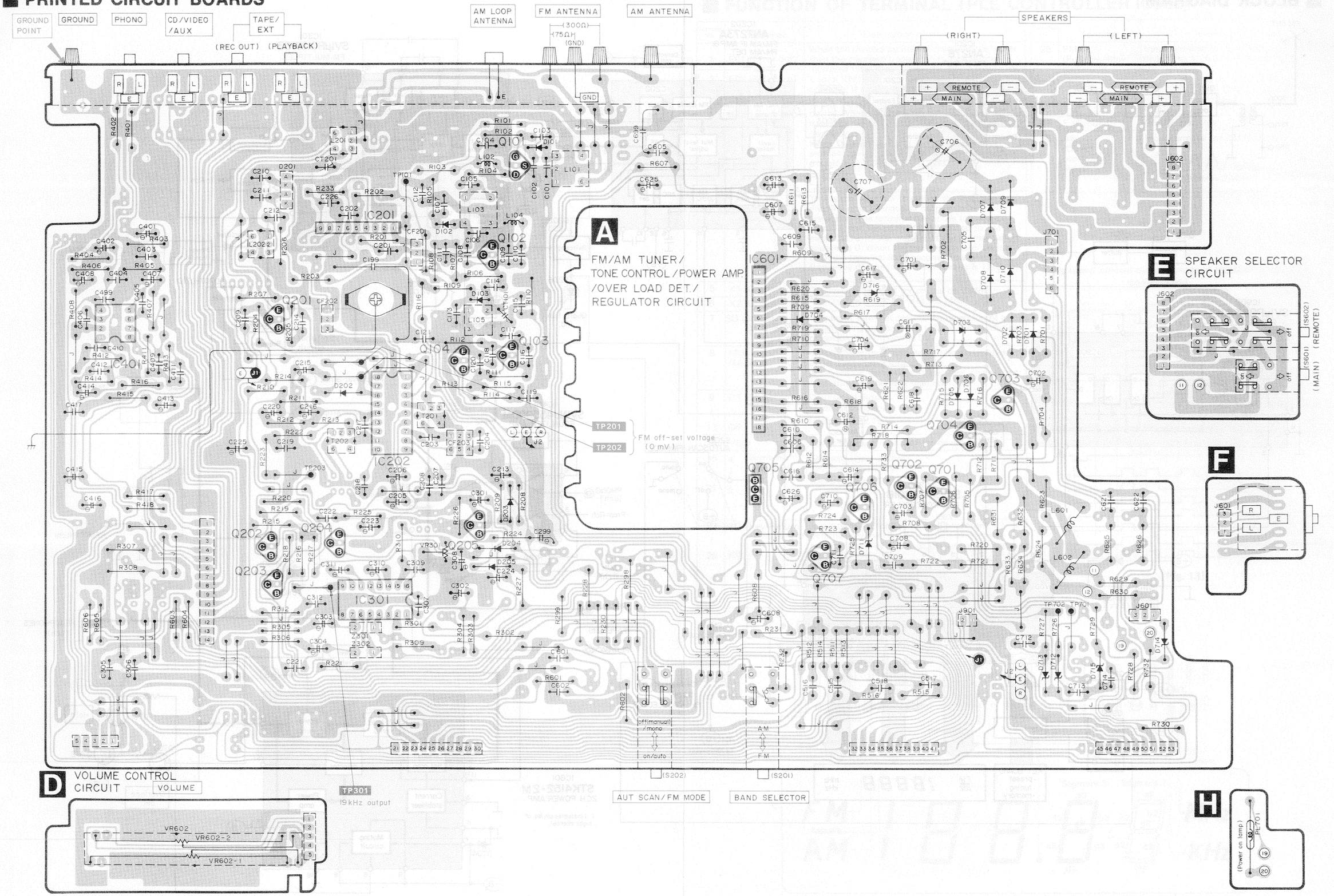
- **Adjustment points**



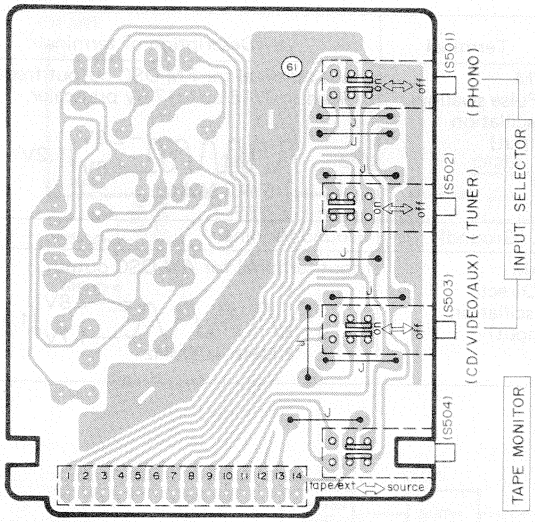
■ WIRING CONNECTION DIAGRAM (Top View)



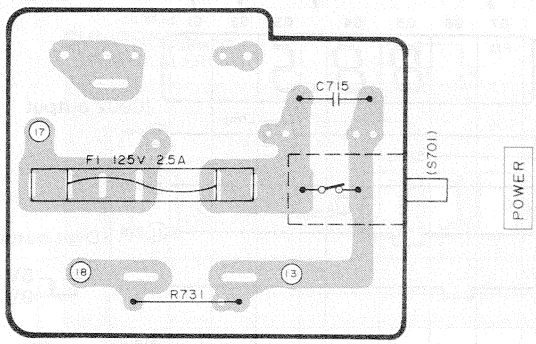
■ PRINTED CIRCUIT BOARDS



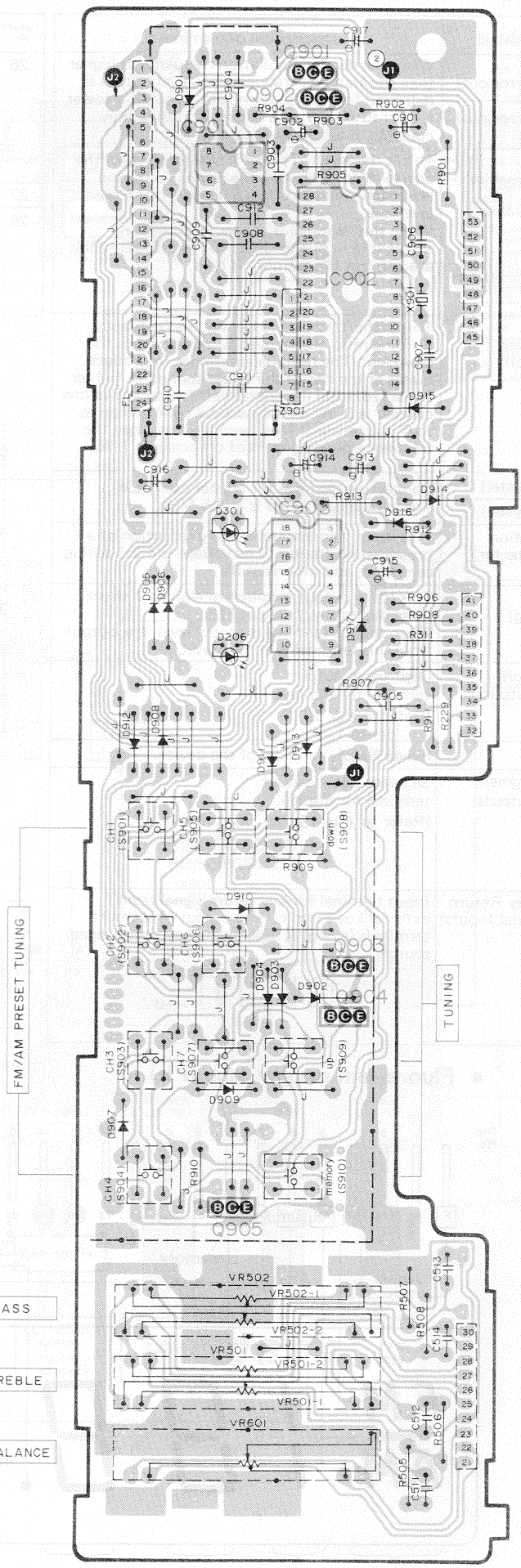
C INPUT SELECTOR CIRCUIT



G

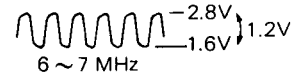
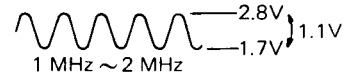


B FM/AM PRESET-TUNING/ TONE CONTROL CIRCUIT

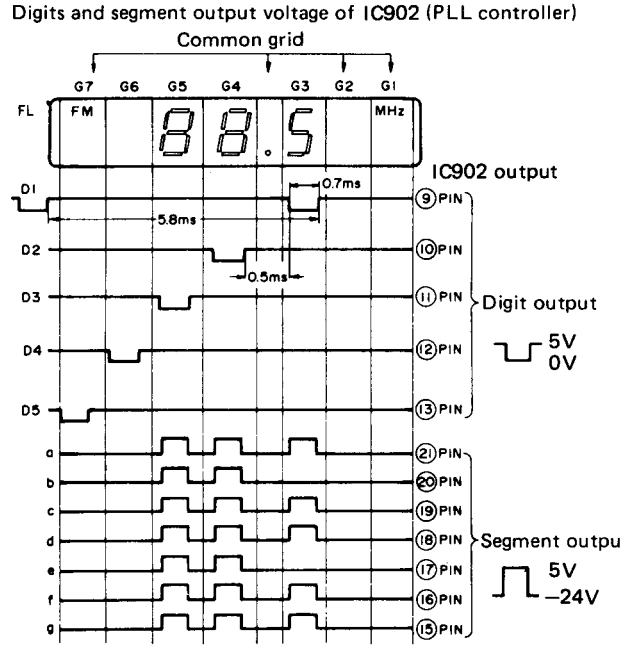


■ FUNCTION OF TERMINAL (PLL CONTROLLER IC902)

Terminal No.	Terminal	Description of terminal
1	E01 (Error out)	When the divided oscillation frequency is higher than the standard frequency, H-level output is delivered from these terminals. When it is lower, L-level (0V) output is delivered. When they coincide, it results in floating.
2	E02 (Error out)	
3	CE (Chip Enable)	This is the selected signal input terminal of the device. When operating the device, make the level high, and when it is not used, make the level low. When this terminal is at low level, all the segment (a ~ g) and digits (D1 ~ D5) terminals are off, but the memory is held.
4	PSC (Prescaler Control)	This is the terminal to deliver the frequency dividing ratio changeover output signal to the pre-scaler. The terminal continues to produce pulses at the rise of the signal applied to FM terminal (26) until the content of the inside swallow counter is 0. When the swallow counter comes to 0, the terminal level becomes low, then the frequency dividing ratio of pre-scaler is 1/16.
5	X1 (Crystal)	Connecting terminal for crystal oscillator. The crystal connected is at 4.5 MHz.
6	X2 (Crystal)	
7	SD (Station Detector)	This input terminal detects the reception of a broadcasting station. The voltage is 4.2V during reception, and otherwise 0V.
8	MUT (Muting)	This is the output terminal to eliminate shock noise due to unlocking at PLL. When the CE terminal is at low level, the output from this terminal is at high level.
9 ~ 13	D1 (Digit Outputs) ~ D5	Digit signal output terminal for display. (Refer to Fig. 19)
14	VDD	Power supply terminal of the device.
15 ~ 21	a (Segment Outputs) ~ g	Segment signal output terminal for display. (Refer to Fig. 13)
22 ~ 25	K3 (Key Return Signal Inputs) ~ K0	Input terminal for key return signal from external key matrix. The output of segment terminals (a ~ g) is used as the key return signal source.

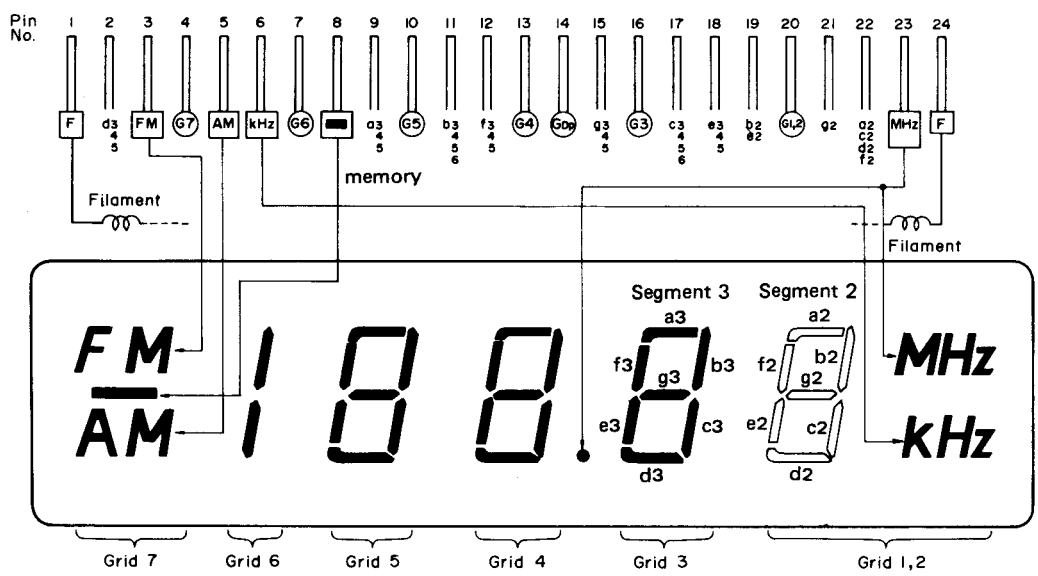
Terminal No.	Terminal	Description of terminal
26	FM (Pulse swallow oscillation input)	Input terminal for FM OSC output frequency-divided to 1/16 or 1/17 by pre-scaler. 
27	E (Ground)	Ground terminal
28	AM (Direct oscillation input)	Input terminal for AM OSC output. 

Digits and segment output voltage of IC902 (PLL controller)

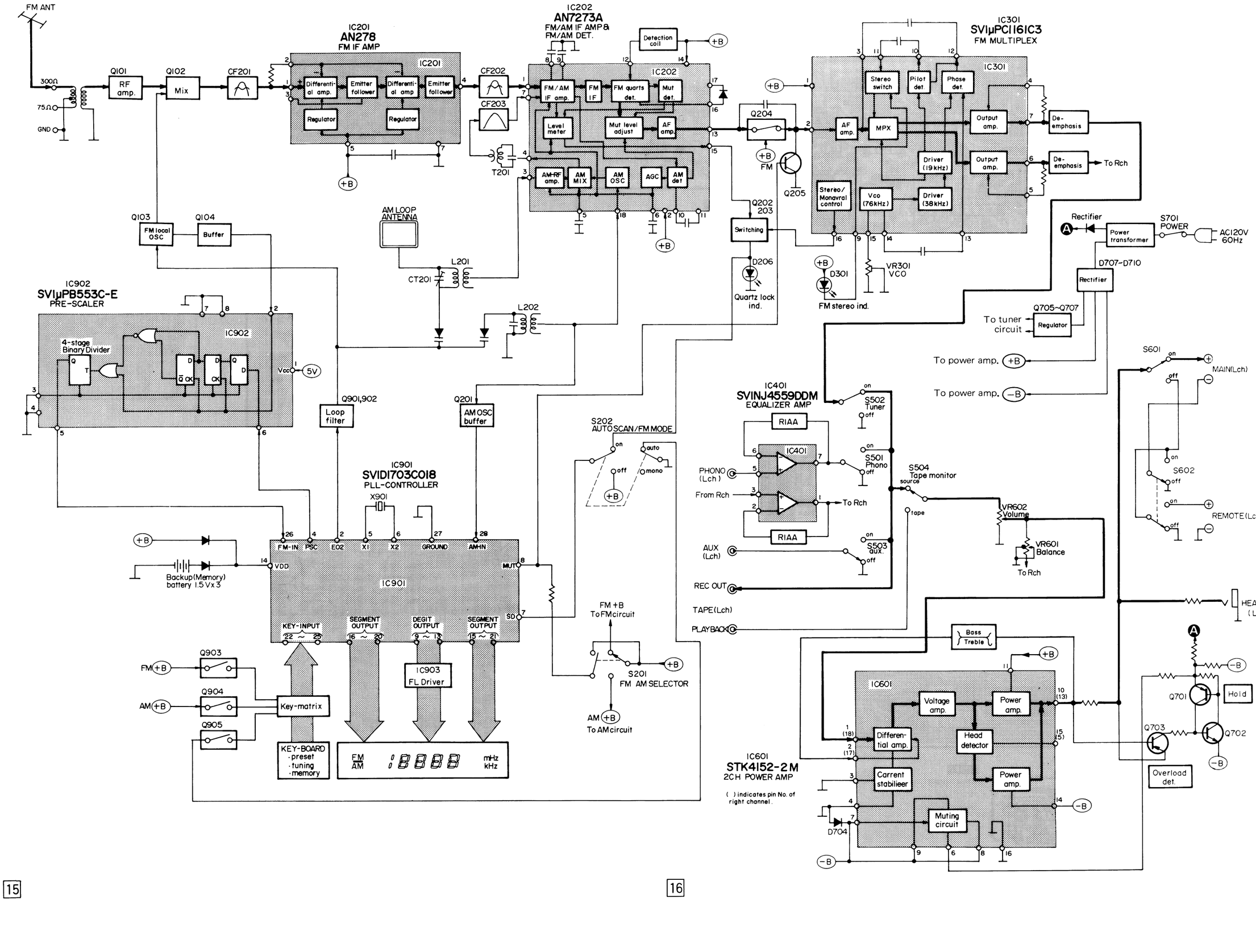


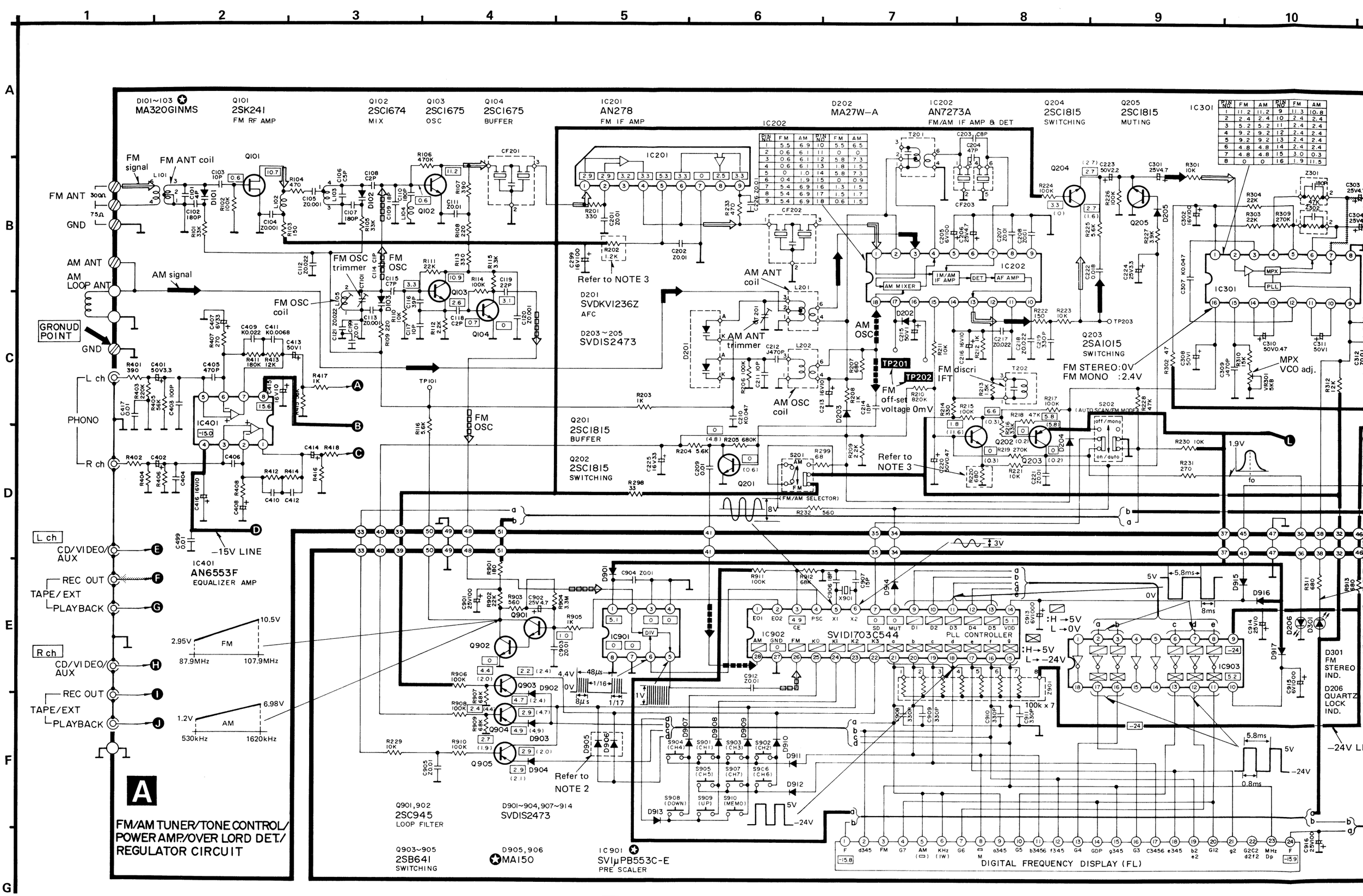
[Fig. 13]

• Fluorescent display tube (FL)



■ BLOCK DIAGRAM





P/N NO.	FM	AM	P/N NO.	FM	AM
1	5.5	6.9	10	5.5	6.5
2	0.6	6.1	11	0	0
3	0.6	6.1	12	5.8	7.3
4	0.6	6.1	13	1.8	1.5
5	0	1.0	14	5.8	7.3
6	0.4	1.9	15	0	0.9
7	5.4	6.9	16	1.3	1.5
8	5.4	6.9	17	1.5	1.7
9	5.4	6.9	18	0.6	1.5

P/N NO.	FM	AM	P/N NO.	FM	AM
1	11.2	11.2	9	11.3	10.8
2	2.4	2.4	10	2.4	2.4
3	5.2	5.2	11	2.4	2.4
4	9.2	9.2	12	2.4	2.4
5	9.2	9.2	13	2.4	2.4
6	4.8	4.8	14	2.4	2.4
7	4.8	4.8	15	3.0	0.3
8	0	0	16	1.9	11.5

D202
MA27W-A

IC202
AN7273A
FM/AM IF AMP & DET

Q204
2SC1815
SWITCHING

Q205
2SC1815
MUTING

IC202

PIN NO.	FM	AM	PIN NO.	FM	AM
1	5.5	6.9	10	5.5	6.5
2	0.6	6.1	11	0	0
3	0.6	6.1	12	5.8	7.3
4	0.6	6.1	13	1.8	1.5
5	0	1.0	14	5.8	7.3
6	0.4	1.9	15	0	0.9
7	5.4	6.9	16	1.3	1.5
8	5.4	6.9	17	1.5	1.7
9	5.4	6.9	18	0.6	1.5

IC301

PIN NO.	FM	AM	PIN NO.	FM	AM
1	11.2	11.2	9	11.3	10.8
2	2.4	2.4	10	2.4	2.4
3	5.2	5.2	11	2.4	2.4
4	9.2	9.2	12	2.4	2.4
5	9.2	9.2	13	2.4	2.4
6	4.8	4.8	14	2.4	2.4
7	4.8	4.8	15	3.0	0.3
8	0	0	16	1.9	11.5

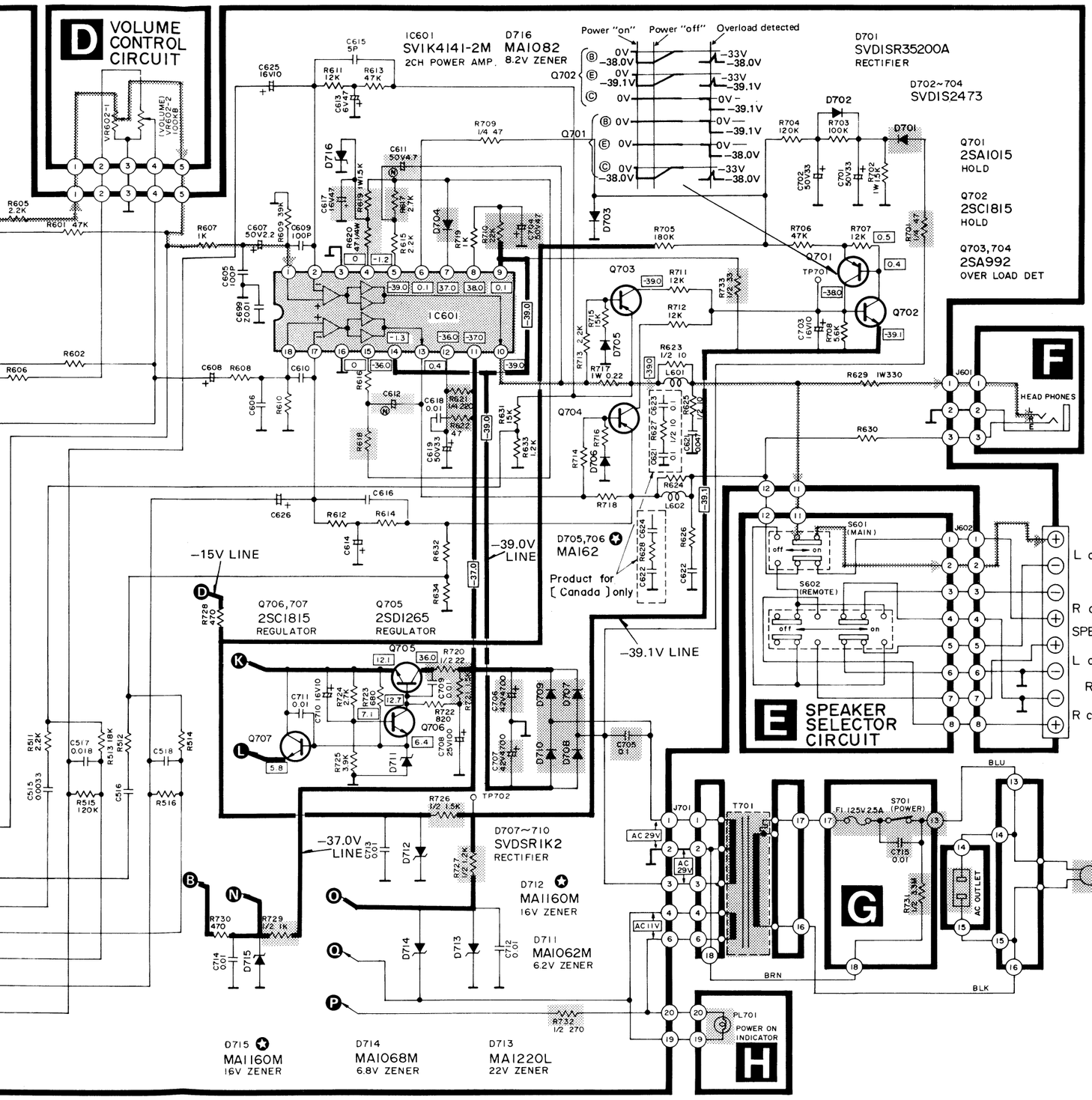
AM ANT coil
AM ANT trimmer
AM OSC coil
AM OSC
FM discri IFT
FM off-set voltage 0mV
Refer to NOTE 3
FM STEREO:0V
FM MONO :2.4V
MPX VCO adj.
Q203 2SA1015 SWITCHING
IC301 SVIμPCII6IC3 FM MULTIPLEX
TP301 19kHz output
1.9V
FM STEREO: 10V
FM MONO :11V
D206,301 LN846RP LED INDICATOR
D915~917 SVDIS2473
IC903 AN6873N FL DRIVER
IC902 SVIDI703C544 PLL CONTROLLER
100k x 7
DIGITAL FREQUENCY DISPLAY (FL)
D301 FM STEREO IND.
D206 QUARTZ LOCK IND.
-24V LINE
-15V LINE
-37.0V LINE
INPUT SELECTOR CIRCUIT
S501~S504 (INPUT SELECTOR)
S501 (PHONO)
S502 (TUNER)
S503 (CD/VIDEO AUX)
S504 (TAPE MONITOR)
BATTERY 1.5V x 3
Q706,707 2SC1815 REGULATOR
D715 MAI160M 16V ZENER
D714 MAI068 6.8V ZEN

C VOLUME CONTROL CIRCUIT

B FM/AM PRESET-TUNING/ TONE CONTROL CIRCUIT

14 15 16 17 18 19

Series connection method is employed for the main and remote speaker connections of this set. Therefore, if both speaker changeover switches (main and remote) are turned "on" with the speaker unit connected only to main or remote speaker terminal, then no output signal will be delivered from the speaker unit.



19 20

■ SCHEMATIC DIAGRAM

(This schematic diagram may be modified at any time with the development of new technology.)

- **The part No. of transistors, IC and diodes mentioned in the schematic diagram stand for production part No. Regarding the part No. with ✪ mark, the production part No. are different from the replacement part No. Therefore, when placing an order for replacement parts, please use the part No. in the replacement parts list.**

NOTE 1

1. **S201** : Band selector switch in "**FM**" position. (▮ FM, ▬ AM)
2. **S202** : Auto scan/FM mode selector switch in "**on/auto**" position. (▮ on/auto, ▬ off (manual)/mono)
3. **S501 ~ S503** : Input selectors switch in "**tuner**" position. (**S501**: phono, **S502**: tuner, **S503**: CD/video/aux)
4. **S504** : Tape monitor selector switch in "**source**" position. (▮ source, ▬ tape/ext)
5. **S601** : Speaker selector (main) switch in "**on**" position. (▮ off, ▬ on)
6. **S602** : Speaker selector (remote) switch in "**off**" position. (▮ off, ▬ on)
7. **S701** : Power switch in "**on**" position. (▮ off, ▬ on)
8. **S901 ~ S907** : Preset-tuning switch. **S901**: FM/AM–1CH, **S902**: FM/AM–2CH, **S903**: FM/AM–3CH, **S904**: FM/AM–4CH, **S905**: FM/AM–5CH, **S906**: FM/AM–6CH, **S907**: FM/AM–7CH
9. **S908, 909** : Tuning switch. (**S908** – down, **S909** – up)
10. **S910** : Memory switch. (manual ↔ auto)
11. Indicated voltage values are the standard values for the unit measured by the DC electronic circuit tester (high-impedance) with the chassis taken as standard.
    Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester.
    * Figures in [▭] stand for DC voltage in FM signal (monaural) reception mode.
    * Figures in ⌐ ¬ stand for DC voltage in FM stereo signal reception mode.
    * Figures in ( ) stand for DC voltage in AM signal reception mode.
12. ▬ Positive (+B) voltage lines or negative (–B) voltage lines
    ▒ AF signal lines (L channel)
    ⇨ FM signal ▬▶ AM signal ▭▷ FM OSC ▬▶ AM OSC

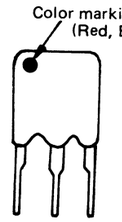
IMPORTANT SAFETY NOTICE

The shaded area on this schematic diagram incorporates special features important for protection from fire and electrical shock hazards.
When servicing it is essential that only manufacturer's specified parts be used for the critical components in the shaded areas of the schematic.

NOTE 2

• Use of ceramic filters in pairs

The ceramic filters (CF201, CF202) for FM-IF circuit are available in two ranks. For this machine, be sure to use the ceramics of the same rank in a pair.
At repairing and replacement, pay close attention to the diodes (D905, D906) for use as different diodes must be used depending on each rank of the ceramic filters.



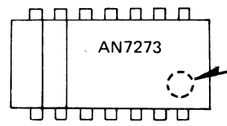
RANK (Color)	D905	D906	CENTER FREQUENCY
Red	X	X	10.70 MHz
Orange	X	O	10. 73 MHz
Blue	O	O	10.67 MHz

Notes: O Mark Diode is used.
X Mark Diode is not used.

NOTE 3

AN7273 (IC202) is available in A rank (AN7273A) and B rank (AN7273B). Either rank can be used for this unit, but the suitable resistor must be used according to the rank as shown in the table below. So, keep this point in mind when repairing or replacing the unit.

RANK / Ref.No.	A	B
R202	1.2kΩ	820Ω
R220	680Ω	560Ω



"A" painted in this position or red mark on main body stands for A rank, and similarly, "B" or green mark stands for B rank.

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■ RESISTORS & CAPACITORS

Notes: 1. Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.
2. Important safety notice: Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.
3. The "Ⓢ" mark is service standard parts and may differ from production parts.
4. The unit of resistance is Ω(ohm), K = 1000Ω, M = 1000kΩ.
5. The unit of capacitance is μF (microfarad). P = 10^{-6} μF
6. Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.

Resistor Type	Wattage	Tolerance
ERD : Carbon	25 : 1/4W	J : ± 5%
ERG : Metal Oxide	1 : 1W	K : ±10%
ERX : Metal Film	S1 : 1/2W	
ERC : Solid	12 : 1/2W	

Capacitor Type	Voltage		Tolerance
	ECEA Type	Other	
ECEA : Electrolytic	0J : 6.3V	1H : 50V	C : ±0.25pF
ECCD : Ceramic	1A : 10V	KC : 400V AC	J : ±5%
ECKD : Ceramic	1C : 16V		K : ±10%
ECQM : Polyester	1E : 25V		Z : +80%, −20%
ECET : Electrolytic	1H : 50V		P : +100%, −0%
ECEA..N : Non Polar Electrolytic	25 : 25V		
ECQP : Polypropylene	45 : 45V		
ECBT : Electrolytic			

● RESISTORS

Ref. No.	Part No.	Value
R101 Ⓢ	ERD25TJ333	33K
R102 Ⓢ	ERD25TJ104	100K
R103 Ⓢ	ERD25FJ151	150
R104 Ⓢ	ERD25FJ471	470
R105 Ⓢ	ERD25TJ333	33K
R106 Ⓢ	ERD25TJ474	470K
R107 Ⓢ	ERD25FJ391	390
R108,109 Ⓢ	ERD25FJ221	220
R110 Ⓢ	ERD25FJ103	10K
R111 Ⓢ	ERD25TJ223	22K
R112 Ⓢ	ERD25FJ222	2.2K
R113 Ⓢ	ERD25FJ331	330
R114 Ⓢ	ERD25TJ104	100K
R115 Ⓢ	ERD25FJ332	3.3K
R116 Ⓢ	ERD25FJ562	5.6K
R201 Ⓢ	ERD25FJ331	330
R202 Ⓢ	ERD25FJ122	1.2K
R203 Ⓢ	ERD25FJ102	1K
R204 Ⓢ	ERD25FJ562	5.6K
R205 Ⓢ	ERD25TJ684	680K
R206 Ⓢ	ERD25TJ104	100K
R207 Ⓢ	ERD25FJ681	680
R208 Ⓢ	ERD25FJ102	1K
R209 Ⓢ	ERD25FJ222	2.2K
R210 Ⓢ	ERD25TJ824	820K
R211 Ⓢ	ERD25FJ103	10K
R212 Ⓢ	ERD25FJ102	1K
R213 Ⓢ	ERD25FJ152	1.5K
R214 Ⓢ	ERD25FJ331	330
R215 Ⓢ	ERD25TJ104	100K
R216 Ⓢ	ERD25TJ333	33K
R217 Ⓢ	ERD25TJ104	100K
R218 Ⓢ	ERD25TJ473	47K
R219 Ⓢ	ERD25TJ274	270K

Ref. No.	Part No.	Value
R220 Ⓢ	ERD25FJ681	680
R221 Ⓢ	ERD25FJ103	10K
R222 Ⓢ	ERD25FJ151	150
R223 Ⓢ	ERD25FJ103	10K
R224 Ⓢ	ERD25TJ104	100K
R225 Ⓢ	ERD25FJ562	5.6K
R226 Ⓢ	ERD25TJ104	100K
R227 Ⓢ	ERD25FJ392	3.9K
R228 Ⓢ	ERD25TJ473	47K
R229,230 Ⓢ	ERD25FJ103	10K
R231 Ⓢ	ERD25FJ271	270
R232 Ⓢ	ERD25FJ561	560
R233 Ⓢ	ERD25FJ471	470
R298 Ⓢ	ERD25FJ330	33
R299 Ⓢ	ERD25FJ680	68
R301 Ⓢ	ERD25FJ103	10K
R302 Ⓢ	ERD25FJ470	47
R303,304 Ⓢ	ERD25TJ223	22K
R305,306 Ⓢ	ERD25FJ392	3.9K
R307,308 Ⓢ	ERD25TJ104	100K
R309 Ⓢ	ERD25TJ274	270K
R310 Ⓢ	ERD25TJ153	15K
R311 Ⓢ	ERD25FJ681	680
R312 Ⓢ	ERD25TJ123	12K
R401,402 Ⓢ	ERD25FJ391	390
R403,404 Ⓢ	ERD25TJ224	220K
R405,406 Ⓢ	ERD25TJ563	56K
R407,408 Ⓢ	ERD25FJ271	270
R411,412 Ⓢ	ERD25TJ184	180K
R413,414 Ⓢ	ERD25TJ123	12K
R415,416 Ⓢ	ERD25TJ563	56K
R417,418 Ⓢ	ERD25FJ102	1K
R505,506 Ⓢ	ERD25FJ561	560
R507,508 Ⓢ	ERD25FJ222	2.2K

Ref. No.	Part No.	Value
R511,512 Ⓢ	ERD25FJ222	2.2K
R513,514 Ⓢ	ERD25TJ183	18K
R515,516 Ⓢ	ERD25TJ124	120K
R601,602 Ⓢ	ERD25TJ473	47K
R603,604 Ⓢ	ERD25TJ823	82K
R605,606 Ⓢ	ERD25FJ222	2.2K
R607,608 Ⓢ	ERD25FJ102	1K
R609,610 Ⓢ	ERD25TJ393	39K
R611,612 Ⓢ	ERD25TJ123	12K
R613,614 Ⓢ	ERD25TJ473	47K
R615,616 Ⓢ	ERD25FJ222	2.2K
R617,618 Ⓢ	ERD25FJ272	2.7K
R620 ⚠Ⓢ	ERD25FJ470	47
R619 ⚠Ⓢ	ERG1ANJ152	1.5K
R621 Ⓢ⚠	ERD25FJ221	220
R622 Ⓢ	ERD25FJ470	47
R623,624 ⚠	ERDS1FJ100	10
R625,626 (M)only	ERDS1FJ100	10
R627,628 (MC)only	ERDS1FJ100	10
R629,630 ⚠	ERDS1FJ331	330
R631,632 Ⓢ	ERD25TJ153	15K
R633,634 Ⓢ	ERD25FJ122	1.2K
R701 Ⓢ⚠	ERD25FJ470	47
R702 Ⓢ	ERG1ANJ152	1.5K
R703 Ⓢ	ERD25TJ104	100K
R704 Ⓢ	ERD25TJ124	120K
R705 Ⓢ	ERD25TJ184	180K
R706 Ⓢ	ERD25TJ473	47K
R707 Ⓢ	ERD25TJ123	12K
R708 Ⓢ	ERD25FJ562	5.6K
R709 Ⓢ⚠	ERD25FJ470	47
R710 Ⓢ	ERD25TJ223	22K

Ref. No.	Part No.	Value
R711,712 Ⓢ	ERD25TJ123	12K
R713,714 Ⓢ	ERD25FJ222	2.2K
R715,716 Ⓢ	ERD25TJ153	15K
R717,718 Ⓢ	ERX1ANJR22	0.22
R719 Ⓢ	ERD25FJ102	1K
R720 ⚠	ERDS1FJ220	22
R721 ⚠	ERDS1FJ152	1.5K
R722 Ⓢ	ERD25FJ821	820
R723 Ⓢ	ERD25FJ681	680
R724 Ⓢ	ERD25FJ272	2.7K
R725 Ⓢ	ERD25FJ392	3.9K
R726 ⚠	ERDS1FJ152	1.5K
R727 ⚠	ERDS1FJ122	1.2K
R728 Ⓢ	ERD25FJ471	470
R729 ⚠	ERDS1FJ102	1K
R730 Ⓢ	ERD25FJ471	470
R731 Ⓢ	ERC12ZGK335	3.3M
R732 ⚠	ERDS1FJ271	270
R733 ⚠	ERDS1FJ330	33
R901 Ⓢ	ERD25FJ181	180
R902 Ⓢ	ERD25TJ223	22K
R903 Ⓢ	ERD25FJ561	560
R904 Ⓢ	ERC12ZGK335	3.3M
R905 Ⓢ	ERD25FJ102	1K
R906 Ⓢ	ERD25TJ104	100K
R907 Ⓢ	ERD25TJ683	68K
R908 Ⓢ	ERD25TJ104	100K
R909 Ⓢ	ERD25TJ683	68K
R910,911 Ⓢ	ERD25TJ104	100K
R912 Ⓢ	ERD25TJ683	68K
R913 Ⓢ	ERD25FJ681	680

● CAPACITORS

Ref. No.	Part No.	Value
C101 Ⓢ	ECCD1H040CC	4P
C102 Ⓢ	ECCD1H181K	180P
C103 Ⓢ	ECCD1H100KC	10P
C104,105 Ⓢ	ECKD1H102ZF	0.001
C106 Ⓢ	ECCD1H050CC	5P
C107 Ⓢ	ECCD1H181K	180P
C108 Ⓢ	ECCD1H020CC	2P
C109 Ⓢ	ECCD1H180KC	18P
C110 Ⓢ	ECCD1H181K	180P
C111 Ⓢ	ECKD1H103ZF	0.01

Ref. No.	Part No.	Value
C112 Ⓢ	ECKD1H223ZF	0.022
C113 Ⓢ	ECKD1H102ZF	0.001
C114 Ⓢ	ECCD1H010CC	1P
C115 Ⓢ	ECCD1H070CC	7P
C116 Ⓢ	ECCD1H390KC	39P
C117 Ⓢ	ECCD1H100KC	10P
C118 Ⓢ	ECCD1H020CC	2P
C119 Ⓢ	ECCD1H220K	22P
C120 Ⓢ	ECKD1H102ZF	0.001
C121 Ⓢ	ECKD1H223ZF	0.022
C199 Ⓢ	ECKD1H103ZF	0.01

Ref. No.	Part No.	Value
C201,202 Ⓢ	ECKD1H103ZF	0.01
C203 Ⓢ	ECCD1H080CC	8P
C204 Ⓢ	ECCD1H470K	47P
C205	ECEA0JU101	100
C206	ECEA1EU4R7	4.7
C207,208 Ⓢ	ECKD1H103ZF	0.01
C209 Ⓢ	ECKD1H103ZF	0.01
C210	ECQM1H473KV	0.047
C211 Ⓢ	ECCD1H100KC	10P
C212	ECQP1471JZ	470P

Ref. No.	Part No.	Value
C213	ECEA1CU100	10
C214 Ⓢ	ECCD1H180K	18P
C215	ECEA1HU010	1
C216	ECEA1CU100	10
C217,218 Ⓢ	ECKD1H223ZF	0.022
C219 Ⓢ	ECKD1H331KB	330P
C220	ECEA1HUR47	0.47
C221 Ⓢ	ECKD1H103ZF	0.01
C222	ECQM1H183KV	0.018
C223	ECEA1HU2R2	2.2

● CAPACITORS

Ref. No.	Part No.	Value
C224	ECEA1EU3R3	3.3
C225	ECEA1CU330	33
C226 Ⓢ	ECKD1H103ZF	0.01
C299	ECEA1CU101	100
C301	ECEA1EU4R7	4.7
C302	ECEA1CU101	100
C303,304	ECEA1EU4R7	4.7
C305,306	ECQM1H183KV	0.018
C307	ECQM1H473KV	0.047
C308	ECEA1HU010	1
C309	ECQP1471JZ	470P
C310	ECEA1HUR47	0.47
C311	ECEA1HU010	1
C312 Ⓢ	ECKD1H103ZF	0.01
C401,402	ECEA1HU3R3	3.3
C403,404 Ⓢ	ECCD1H101K	100P
C405,406 Ⓢ	ECKD1H471KB	470P
C407,408	ECEA0JU330	33

Ref. No.	Part No.	Value
C409,410	ECQM1H223KV	0.022
C411,412	ECQM1H682KV	0.0068
C413,414	ECEA1HU010	1
C415,416	ECEA1CU100	10
C417 Ⓢ	ECKD1H103ZF	0.01
C499 Ⓢ	ECKD1H103ZF	0.01
C511,512	ECQM1H223KV	0.022
C513,514	ECQM1H104KV	0.1
C515,516	ECQM1H332KV	0.0033
C517,518	ECQM1H183KV	0.018
C601,602	ECQM1H333KV	0.033
C605,606 Ⓢ	ECCD1H101K	100P
C607,608	ECEA1HU2R2	2.2
C609,610 Ⓢ	ECCD1H101K	100P
C611,612 ⚠	ECEA1HN4R7S	4.7
C613,614	ECEA0JU470	47
C615,616 Ⓢ	ECCD1H050CC	5P
C617	ECEA1CU470	47

Ref. No.	Part No.	Value
C618 Ⓢ	ECKD1H103ZF	0.01
C619	ECEA1HU330	33
C621,622 (M)only	ECKD1H473ZF	0.047
C621,622 (MC)only	ECQM1H104KV	0.1
C623,624 (MC)only	ECQM1H104KV	0.1
C625,626	ECEA1CU100	10
C699	ECKD1H103ZF	0.01
C701,702	ECEA1HU330	33
C703	ECEA1CU100	10
C704	ECEA1HU470	47
C705	ECQE104KN	0.1
C706,707	ECETS42V472U	4700
C708	ECEA1EU101	100
C709 Ⓢ	ECKD1H103ZF	0.01
C710	ECEA1CU100	10

Ref. No.	Part No.	Value
C711,712 Ⓢ	ECKD1H103ZF	0.01
C713,714 Ⓢ	ECKD1H103ZF	0.01
C715 ⚠	ECKDKC103PF	0.01
C901	ECEA1EU101	100
C902 Ⓢ	ECEA25M4R7R	4.7
C903,904	ECBT1C103ZYY	0.01
C905	ECBT1C103ZYY	0.01
C906 Ⓢ	ECCD1H180KC	18P
C907 Ⓢ	ECCD1H150KC	15P
C908,909	ECBT1H331KBY	330P
C910,911	ECBT1H331KBY	330P
C912	ECBT1C103ZYY	0.01
C913	ECEA0JU102	1000
C914	ECEA1EU100	10
C915	ECEA0JU102	1000
C916	ECEA1EU101	100
C917	ECEA1CU100	10

■ REPLACEMENT PARTS LIST

Notes: 1. Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.
2. Important safety notice: Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.
3. The "Ⓢ" mark is service standard parts and may differ from production parts.
4. Bracketed indications in Ref. No. columns spedify the area.
5. The parenthesized number in the column of description stand for the quantity per set.

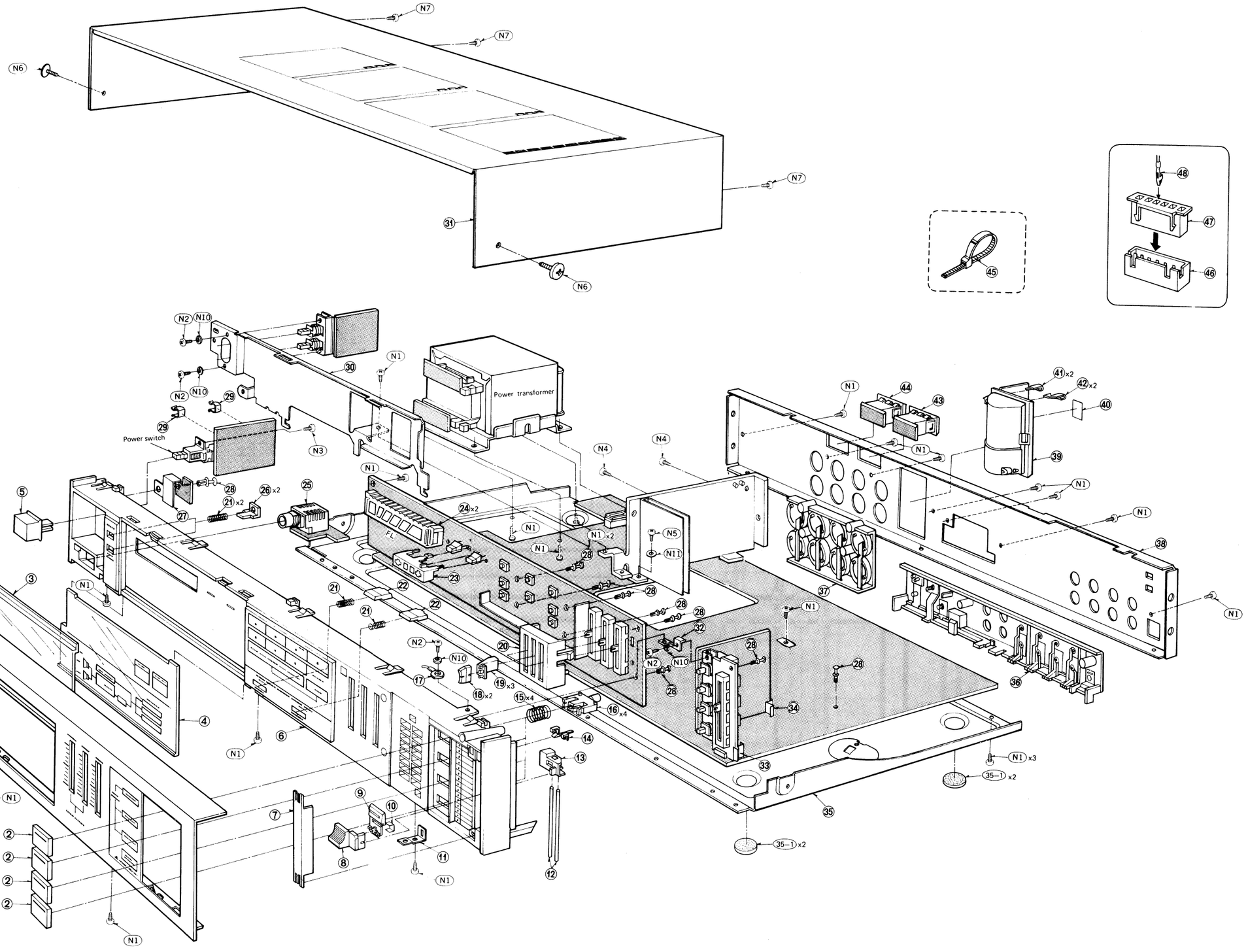
Areas * [M] is available in the U.S.A.
* [MC] is available in Canada.

Ref. No.	Part No.	Part Name & Description
INTEGRATED CIRCUITS		
IC201	AN278	FM IF Amp.
IC202	AN7273A	FM IF Det. & AM Converter
IC301	SVIUPC1161C3	AM AF Amp., FM MPX
IC401	AN6553F	Equalizer
IC601 ⚠	SVIK4141−2M	Power Amplifier
IC901	SVIUPB553AC	Pre-Scaler
IC902	SVID1703C544	PLL Controller (Micro-Computer)
IC903	AN6873N	FL Drive.
TRANSISTORS		
Q101	2SK241−GR	FM RF Amp.
Q102 Ⓢ	2SC1674−M	FM Mixer
Q103,104 Ⓢ	2SC1675−L	FM Oscillator, Buffer
Q201,202,204, 205,702,706, 707	2SC1815−Y	Buffer, Switching Muting, Regulator
Q203,701	2SA1015−Y	Switching
Q703,704	2SA992	
Q705	2SD1265−0	Regulator
Q901,902 Ⓢ	2SC945−Q	L. P. F
Q903,904,905	2SB641R	Switching
DIODES		
D101,102,103	MA320G1−N	FM Variable Capacitor
D201	SVDKV1236Z	AM Variable Capacitor
D202	MA27W−A	
D203,204,205, 702,703,704, 799, 901~904, 907~911	SVD1S2473	Switching
D206,301	LN846RP	L. E. D.(FM Stereo, Quartz Lock)
D701 ⚠	SVD1SR35200A	Rectifier
D705,706, 905,906 Ⓢ	MA162A	Switching
D707~710 Ⓢ⚠	SVDSR1K2	Rectifier
D711	MA1062M	Zener, 6.2V
D712,715	RD16EB	Zener, 16V
D713	MA1220L	Zener, 22V
D714	MA1068M	Zener, 6.8V
D716 Ⓢ	SVDRD8.2EB	Zener, 8.2V
COILS		
L101	SLA4N41	FM Antenna
L102,104	ELEPK1R2MA	Choke
L103	SLD4P87	FM Detector
L105	SL04N27−P	FM OSC
L201	SLA2B1−P	AM Antenna
L202	SL02B7−P	AM OSC
L601,602	SLQY07G−30	Choke
TRANSFORMERS		
T201	SLI2B101−M	AM IFT
T202	SLI4B519−P	FM IFT
T701[M] ⚠	SLT5M365	Power Source
T701[MC] ⚠	SLT5M367	Power Source
CERAMIC FILTERS		
CF201,202	SVFE107MS8A	FM, 10.7MHz (Red)
	SVFE107MS8B	FM, 10.68MHz (Blue)
	SVFE107MS8C	FM, 10.72MHz (Orange)
(Use pair ranks as same as CF 201 and CF202)		
CF203	SVFSFZ450F7L	AM, 450KHz

Ref. No.	Part No.	Part Name & Description
VARIABLE RESISTORS		
VR301	EVNE4AA00B53	FM MPX VCO Adjustment, 5KΩ (B)
VR501,502	EWANA6X05C15	Tone, 100KΩ(C)
VR601	EWANF5X05G15	Balance, 100KΩ(G)
VR602	EWAPBAX05B15	Volume, 100KΩ(B)
VARIABLE CAPACITORS		
CT101	ECRHA007A11	FM OSC
CT201	ECRHA010A11	AM Antenna
COMPONENT COMBINATIONS		
Z301,302	EXRP181K473C	180pF, 47KΩ
Z901	EXBP87104M	100KΩ(×7)
CRYSTAL		
X901	SVQ43U452−D	4.5MHz
FLUORESCENT DISPLAY TUBE		
FL	SAD7BT05A	
LAMP		
PL701 ⚠	XAMS6Q17	12V, 110mA
FUSE		
F1 ⚠	XBA1F25NU14	125V, 2.5A
SWITCHES		
S201	SSH1160	FM/AM Band Selector
S202	SSH179	FM Mode
S501~504	SSH478	Input Selector
S601,602	SSH2087	Speakers Selector
S701 ⚠	SSH1071	Power Source
S901~910	SSG13	Preset Tuning, Memory
CABINET AND CHASSIS PARTS		
1	SGWA150−SM	Front Panel, Ass'y (1)
2	SBC573−1T	Button, Input Selector (4)
3	SGU409	Transparent Cover (1)
4	SDLA250−SM	Cover, Indication Transparent (1)
5	SBC627	Button, Power Switch (1)
6	SGXA150−SM	Front Sub Panel, Ass'y (1)
7	SGX7669	Ornament (1)
8	SBD96	Knob, Volume (1)
9	SBE295	Spacer, Volume Knob (1)
10	SHR5274	Spacer, Volume Knob (1)
11	SNE92	Bracket (1)
12	SUG183	Rod, Slider (2)
13	SHR9273	Slider, Volume Knob (1)
14	SHR322	Spacer (1)
15	SUS191−1	Spring, Button (4)
16	SHR9724	Holder (4)
17	SJT231	Terminal (1)
18	SBD97	Knob, Tone, Balance (3)
19	SBZ9018	Holder, Knob (3)
20	SGX7668	Ornament, Tone, Balance (1)
21	SUS257	Spring, Button (4)
22	SBC565−1T	Button (2)
23	SMP373	Holder, L. E. D (1)
24	SMN1910	Bracket, FL Holder (2)
25	SJJ71B	Jack, Headphone(1)

Ref. No.	Part No.	Part Name & Description
CABINET AND CHASSIS PARTS		
26	SBC483−6T	Button, Speaker (2)
27	SMP377	Holder, Lamp (1)
28	SHR415	Lock Pin (8)
29	SJT345	Holder, Fuse (2)
30	SMC1140	Shield Cover (1)
31	SKC1191S1	Cabinet (1)
32	SUW2832	Bracket, Switch P. C. B. (1)
33	SME103−2	Bracket, P. C. B.(1)
34	SME103−3	Bracket, P. C. B.(1)
35	SKUA250−SM	Bottom Board, Ass'y (1)
[35−1	[SKL245−2	Foot (4)
36	SJF8037−15N	Terminal Board (1)
37	SJF4815−2	Terminal Board, Speaker (1)
38	SGP6160A	Rear Panel (1)
39	SJB3005−1	Battery Cover (1)
40	SGK1569−1	Label (1)
41	SJC7	Terminal, Battery (2)
42	SJC9	Terminal, Battery (2)
43[M]	SJS9232A	AC Outlet (1)
43[MC]	SJS9233A	AC Outlet (1)
44	SJS9231A	Socket, AC Inlet (1)
45	SHR301	Clamper (1)
46	SJT3611	Post(6 pin) (1)
46	SJT3213	Post(2 pin) (1)
47	SJS5629	Socket(6 pin) (1)
47	SJS5215	Socket(2 pin) (1)
48	SJT783	Terminal (8)
SCREWS		
N1	XTBS3+8BFZ1	Tapping with Detent, ⊕3×8 (22)
N2 Ⓢ	XSN3+6S	⊕3×6 (4)
N3 Ⓢ	XTB3+8BFN	Tapping, ⊕3×8 (1)
N4 Ⓢ	XTB3+14BFN	Tapping, ⊕3×14(2)
N5 Ⓢ	XTN3+8B	Tapping, ⊕3×8 (1)
N6	SNE2095−4	(2)
N7 Ⓢ	XTB3+8BFN	Tapping, ⊕3×8 (3)
WASHERS		
N10 Ⓢ	XWA3B	Spring, ϕ3 (4)
N11 Ⓢ	XWG3	Plain, ϕ3 (1)
ACCESSORIES		
A1[M] ⚠	SJA159	Cord, AC Power Source (1)
A1[MC] ⚠	SJA166	Cord, AC Power Source (1)
A2	SSA902	Loop Amtenna (1)
A3	SMA231	Holder (1)
A4	SMA233−1	Holder (1)
A5	XTN3+10AFZ	Screw, Loop Antenna Holder (2)
A6	SSA269	Cord, FM Antenna (1)
A7[M]	SQF12039	Instruction Book (1)
A7[MC]	SQF12041	Instruction Book (1)
PACKING PARTS		
P1	SPP699	Polyethlene Bag (1)
P2	SPS4432	Pad, Left Side (1)
P3	SPS4433	Pad, Right Side (1)
P4[M]	SPG4813	Carton Box (1)
P4[MC]	SPG4814	Carton Box (1)

■ EXPLODED VIEWS



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